

**RESEARCH PAPER****Expenditure Raises Income: An Empirical Analysis of Income and Expenditure****¹Jhaman Das Hirani* and ² Rafiq Ahmed Chandio**

1. PhD Scholar, Department of Economics, University of Sindh Jamshoro, Sindh, Pakistan

2. Professor, Department of Economics, University of Sindh Jamshoro, Sindh, Pakistan

Corresponding Author jrhirani@yahoo.com**ABSTRACT**

This paper intends to examine this relationship between municipal income and expenditure using ten-year data on four municipalities. Since, it is argued that municipalities spending raise their income. The Ordinary Least Square (OLS) regression and Fixed Effect Method (FEM) are used to verify this relationship. Furthermore, the municipal expenditures collectively and its components were tested individually against cumulative income and separate income components and vice versa. From all these testings and examination the results confirm that municipal expenditures have positive and significant effect on municipal income. With increase of each unit in municipal expenses the income also increases. Similarly, panel estimates indicate that a one percent increase in the expenditures results in more than one percent increase in municipal income. Based on both time series and panel estimates, it is recommended to identify rewarding municipal services and spend upon such services to increase local income.

Keywords: Expenditures, Income, Local Services, Municipal Corporations**Introduction**

Local municipal organizations provide multifaceted basic services in local jurisdiction (Karagianni & Theriou, 2018; Rodriguez et al., 2009; Ahmad, et al., 2015)). all Municipalities are required to spend financial resources to deliver mandated municipal services (Schoute et al., 2017). Municipal expenditures include cost of water supply, removal of waste, street maintenance, firefighting, and other health emergency services (Khale 2015, Jenerette et al., 2006). Municipal expenditures depend on the type and size of council. The greater the operational scale the higher are related expenditures (Tran & Dollery, 2019).

There are immediate municipal expenditures also known as current expenditures which include operational and establishment cost. Whereas the other types of expenditures are known as long term or capital expenditures. They include development spending and other infrastructure development (Hudecek et al., 2019; Aleluia & Ferrao, 2017; Lohri et al., 2014).

These expenditures are met through municipal income generated mainly from local taxes and fees. The empirical literature on willingness to pay taxes directly associates it with the quality of municipal service delivery (Deichmann and Lall, 2007; Glaser and Hildreth, 1999). However, there are different factors which influence municipal service delivery. The funds shortage is one among major decisive reasons to affect overall service delivery in local municipalities (Hirani & Chandio, 2024).

Local income of municipalities establishes a significant and positive impact on capital income. In addition to that the capital expenditures are also affected by funds allocation and revenue sharing formula in municipalities (Kuntari et al., 2019). There is a significant relationship between capital expenditures and special grants. When the grants are increased the municipalities tend to spend more on capital expenditures. Even local

revenue has a direct positive relationship with capital spending (Mulyana et al., 2022; Sekula, 2013). A similar study conducted in the USA found an increase in capital expenditures even during recession, due to special grants (Fisher & Wassmer, 2015). This also explains that local governments having more resources at hand tend to spend more on capital expenditures.

Budgetary expenditures and effective cost are important factors to gauge municipal service delivery. The effectiveness of the input cost is a major determinant for efficient service delivery (Garcia-Unanue et al., 2021). Efficiency in spending amounts for comprised municipal services (Mahabir, 2014). Amongst other factors the funds shortage and constraints of related resources are dominating factors which hamper overall municipal service delivery (Kanyane, 2016; Arcelus et al., 2013). Fundings shortage has increased the demand to adopt various municipal financial management initiatives and budget efficiency approaches (Graves and Dollery, 2009). Hence, financial sustainability through improved income by local investments is crucial for improving municipal service delivery (Tran et al., 2018).

Government spending is more productive when expenditures are directed to prudent spending. Even in some cases the misconceived non-productive expenditures like spending on infrastructures turns to be more rewarding and productive (Jarnberg and Varja, 2022). Boustan et al., (2012) found a relationship between income of residents and tax revenue of local municipalities. This further also affects the public expenditures in municipalities. The expenditures of local municipalities establish a positive relationship with local municipal income (Hirani et al., 2024).

However, due to limited scope this study did not explain how municipal income establishes individual relationship with municipal expenses including services, and development expenditures and vice versa.

The income of local government has a significant impact on expenditures. Empirical literature has also provided evidence of significant impact of government transfers and marginal impact of local income on municipal expenditures (Amusa et al., 2008).

The spending of local government depends on the income either generated from our own sources or received through government grants (Abba et al., 2017; Skidmore, 1999). There is empirical evidence that local municipal income has a strong and positive relationship with municipal capital expenditures. However other allocated funds depicted moderate relationship with capital expenditure (Mulyani, 2016). The spending on public initiative including community infrastructure and childcare expenditures have a positive relationship with municipal income growth (Rafique, et. al., 2023; Jarnberg & Varja, 2022).

Thus, the available empirical literature explains a relationship between municipal expenditures with income in two ways. Firstly, municipal spending is categorically determined by municipal income either generated from own resources or collected through government receipts. Secondly, there are certain municipal expenditures which have a positive relationship with municipal income. This paper also tests both relationships with a particular focus on the second one with further explanation that how municipal expenditures in fact improve municipal income. The empirical evidence garnered through the swapping of the position of each individual contributing factor of both municipal income and expenditure further confirms these relationships. The outcomes and explanatory variables, tested in regression equation included local income, provincial grants, service expenditures, development spending and other operational cost.

Economic crises and other related problems are already a grave challenge for local government revenue (Bartle et al., 2011; Rafique, et. al., 2023). However, there is evidence that when local government has more revenue it tends to spend more on municipal services

and people welfare (Aryani et al., 2019). The additional spending by local municipalities on services and infrastructure tends to motivate residents to pay more taxes and local bills. The ultimate results are additional local revenues (Hirani et al., 2024).

Rather than just spending on basic services and repair of infrastructures, the investment of local councils may include investment in recreational centers and local schools (Ryser et al., 2019). Local councils in urban areas have more opportunities of investing in lands and buildings to generate sufficient revenues (Jiang and Waley, 2020). Even the investment in fundamental municipal services like prudent investment in water related infrastructure development and its management may also be rewarding (Pot, 2019). Municipal investments are dependent on the overall economic health of municipalities. However, this investment has a positive relationship with tax revenue and negative with social secondary spending (Felix et al., 2015).

The literature also suggests the way forward through revamping and upgrading municipal financial capacities. The more municipalities can deliver and spend on local services the higher are chances of their financial self-sufficiency (Jain and Joshi, 2015). Digitalization and incorporation of technology may also improve transparency and accountability systems which will ultimately encourage additional revenue by taxpayers (Morendo and Zabala, 2023; Ringenson et al., 2018). Moreover, there is gap between mandated municipal services and services provided on the ground. Local municipal administration is required to identify such gap and address such services which local councils are mandated to deliver (Hirani et al., 2023).

In this paper, we also examine the impact of capital expenditures on municipal corporation income. Results obtained from both panel data and time series estimates indicate positive impact of capital expenditures on the municipal corporation income.

The rest of the paper proceeds as: data and its sources are discussed in section 2, followed by material and method discussion in section 3.

Ten years' time series data spanning from year 2014 to year 2023 was collected from four different municipal entities. Amongst the five different administrative divisions, the Hyderabad and Mirpurkhas divisions were opted at first stage. On the second stage the highest municipal setup at divisional level, which is municipal corporations, were taken to assess and understand the relationship and responsiveness of income and expenditure.

Descriptive statistics for the income component of selected municipalities are presented in table no. 01 and expenditure component in table no. 02.

Table 1
Descriptive Statistics for the Income of Municipalities

Descriptive Statistics	HMC	MMC	QMC	DTC
Mean	2.66	3.01	2.66	2.34
Median	2.64	3.02	2.64	2.33
Maximum	2.74	3.06	2.74	2.40
Minimum	2.59	2.95	2.59	2.27
Std. Dev	0.05	0.03	0.05	0.04
Skewness	0.25	-0.46	0.25	0.12
Kurtosis	1.66	1.79	1.66	1.84
Jarque - Bera	0.84	0.95	0.84	0.57
Probability	0.65	0.62	0.65	0.74

Note: HMC, MMC, QMC, DTC and Std. Dev refers to

Table 2

Descriptive Statistics for the Expenses of Municipalities

Descriptive Statistics	HMC	MMC	QMC	DTC
Mean	2.59	3.00	2.59	2.31
Median	2.57	2.99	2.57	2.32
Maximum	2.72	3.05	2.72	2.38
Minimum	2.47	2.93	2.47	2.22
Std. Dev	0.09	0.04	0.09	0.05
Skewness	0.24	-0.17	0.24	0.31
Kurtosis	1.60	1.82	1.60	2.12
Jarque - Bera	0.91	0.62	0.91	0.47
Probability	0.63	0.73	0.63	0.78

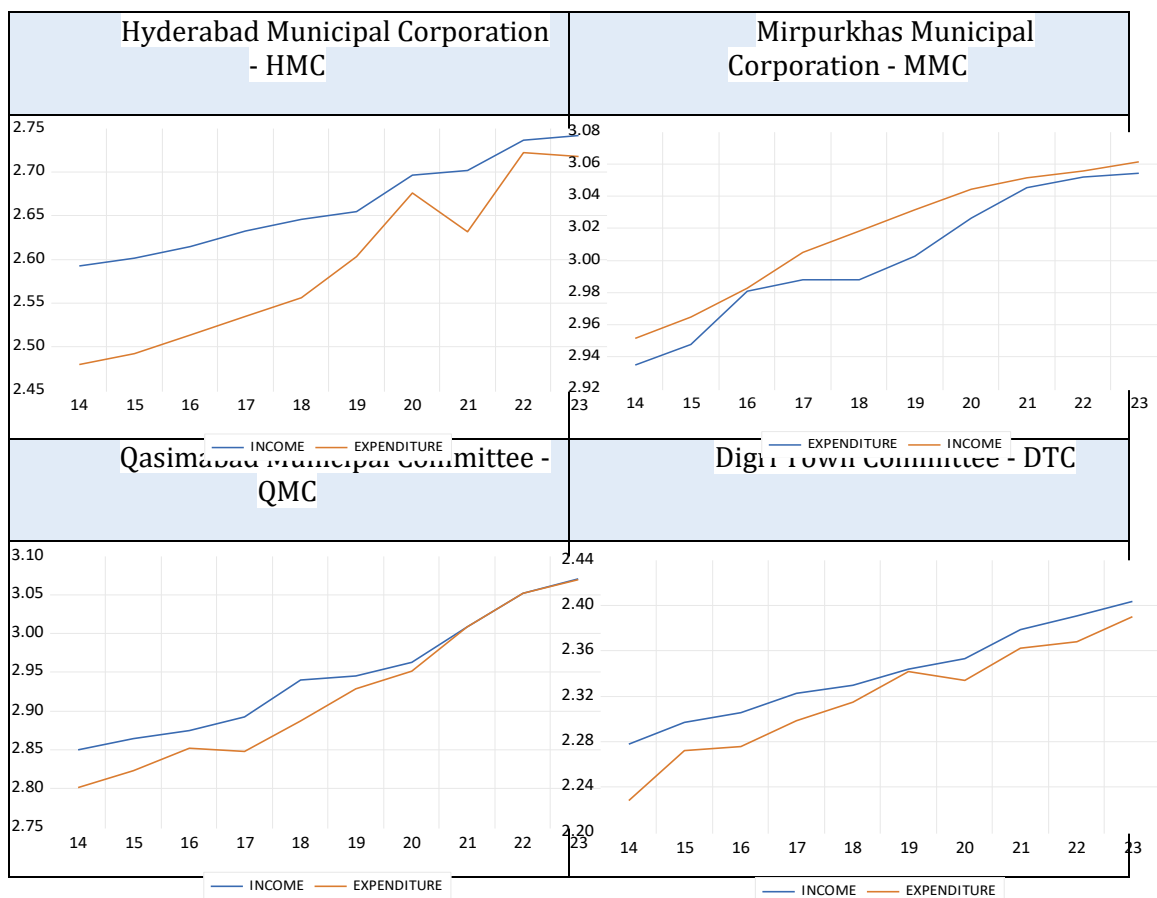


Figure 1 Trend of Income and Expenditures in Local Municipalities

Material and Methods

Both time series and panel data are used for examining the interaction between income and expenditure for the selected municipal corporations. To analyze the interaction of municipal income and expenditure, both time series and panel data was collected from four different municipalities. The relationship between income and expenditure was tested through Ordinary Least Square (OLS) regression method. Jarnberg and Varja, (2023) also examined the relationship between municipal expenditures and income with a focus on how municipal expenditures ensure income growth using both time series and panel data. This paper also adopts the same approach and tests the relationship between income and expenditures for the selected municipalities using both time series and panel data models. Testing municipal income and expenditure relationship through OLS regression method is done and reported by different research studies (Hirani et al., 2024; Anderson et al., 2018; Bakri et al., 2017).

The OLS model used for this research is presented in the equation below.

$$Income_t = \alpha + \beta x_t + u_t \dots\dots\dots (I)$$

Whereas α and β are intercept and slope parameters. In other words, β demonstrates the income sensitivity of local municipalities to their capital expenditures. The stochastic disturbance is represented through u exhibit the effect of all excluded variables upon dependent variable. Subscript t subscript explains that time series data is employed for this estimation

Income here represents earnings the municipals generate from their capital expenditures instead of total expenditures.

However, the holistic view of municipal income and expenditure is also examined by using panel regression (Jarnberg and Varja, 2022; Moscone and Tosetti, 2010). The panel data presents a more informative view, variability and minimum collinearity among variables compared to the time series data. Hence, this study used the panel data analysis approach through fixed effect method as per the mentioned below equation.

$$income_{it} = \alpha + \beta x_{it} + u_{it} \dots\dots\dots (II)$$

Results and Discussion

The relationship between municipal income and expenditure is examined through all possible relationships between both variables. First the municipal income is taken as a dependent variable and municipal expenditure as independent one.

Municipal total income dependent variable and total expenditure independent variable.

**Table 3
Income Relationship with Expenditure**

MC	HMC	MMC	QMC	DTC
Constant	-11.137(12.147) **	0.294(1.283) **	0.594(5.523) **	0.459(3.427) **
x_t	0.587(16.283) *	0.90(11.878) *	0.804(21.840) *	0.811(14.018) *
Residual Diagnostics				
R^2	0.97	0.94	0.98	0.96
Adj R^2	0.96	0.93	0.98	0.95
DW	2.282	1.040	1.95	1.256
F-Statistic	265.138	141.099	477.002	196.516
LM Test	0.598[0.579]	2.344[0.176]	1.679[0.263]	0.207[0.818]
ARCH Test	1.267[0.297]	0.106[0.753]	0.221[0.652]	0.199[0.688]
JB_{NOR}	0.042[0.979]	0.346[0.841]	1.276[0.528]	0.361[0.834]

The results show that capital expenditure has a significant positive effect on the municipalities income. The effect of capital expenditure on the income varies from 0.587 for Hyderabad Municipal corporation to 0.90 for Mirpurkhas Municipal Corporation.

Even estimated values of model fitness and residual testing show that the estimated from the model are appropriate and reliable to report.

Municipal Income as dependent variable and expenditure components as independent variable.

The relationship between municipal income (local revenue) and expenditure components, other than fixed expenditures, was examined. When services expenditure is taken as independent variable and local municipal income as dependent variable this indicated a significant positive significant change. The relationship is explained in equation form as follows:

$$\text{Local income}_t = \alpha + \beta \text{services}_t + u_t \dots\dots\dots (III)$$

It was found that one percent increase in services expenditure the local income also witnesses an increase of 0.12%, 0.42%, 0.07% and 0.42% in HMC, MMC, QMC and DTC respectively.

A similar positive relationship is evident in testing this relationship while taking local income of municipalities as dependent variable and development expenditure as independent one. The equation below explains this regression relationship.

$$\text{Local income}_t = \alpha + \beta \text{development}_t + u_t \dots\dots\dots (IV)$$

The results depict a positive change of 2.34%, 1.83% and 0.15% in HMC, QMC and DTC respectively, while -4.15% negative change in MMC, with a rise of one percent in development expenditures. The regression results are presented in table no.4 below.

Table 4
Local income relationship with expenditure components

OLS	Revenue Ser. Expenditure				Revenue to Dev. Expenditure			
MC	HMC	MMC	QMC	DTC	HMC	MMC	QMC	DTC
Constant	1.99 (77.9)	1.83 (5.70)	2.36 (16.1)	1.08 (17.6)	2.34 (5.99)	-4.15 (-3.0)	1.83 (8.41)	0.15 (0.18)
x_t	0.12 (6.18)	0.42 (2.48)	0.07 (1.17)	0.42 (9.22)	0.09 (-.51)	2.50 (4.92)	0.28 (3.23)	0.88 (1.73)
R^2	0.82	0.43	0.14	0.91	0.03	0.75	0.56	0.27
Adj R^2	0.80	0.36	0.04	0.90	-0.08	0.72	0.51	0.18
DW	2.33	0.81	1.06	0.91	0.51	1.16	1.39	0.30
F-Statistic	38.23	6.19	1.38	85.05	0.26	24.25	10.46	3.02
LM Test	0.198	1.54	10.1	0.60	3.50	0.67	0.96	20.2
Prob	(0.82)	(0.28)	(0.01)	(0.46)	(0.09)	(0.54)	(0.61)	(0.002)
ARCH Test	0.03 (0.85)	0.25 (0.63)	0.06 (0.80)	5.36 (0.04)	0.14 (0.71)	3.29 (0.11)	1.92 (0.22)	2.62 (0.14)
JB_{NOR}	0.75 (0.68)	0.55 (0.75)	0.59 (0.74)	1.10 (0.57)	0.87 (0.64)	0.57 (0.75)	1.54 (0.25)	1.18 (0.55)

Services expenditure being dependent variable and local income as independent ones.

When services expenditure is taken as a dependent variable and local income as independent variable, then a positive relationship is found. This relationship is illustrated in below mentioned equation.

$$\text{Services expenditure}_t = \alpha + \beta \text{Local income}_t + u_t \dots\dots\dots (V)$$

A direct positive change in services is found by 6.81% for HMC, 1.02% for MMC, 1.97% for QMC and 2.16% for DTC, with one percent rise of local municipal revenue. Model fitness, good-ness-of fit and other related results of residuals diagnostic tests are also collected for these above-mentioned relationships and presented in table no. 5 below.

Table 5
Service expenditure relationship within local municipal income

OLS	Services Expenditure to Local Revenue			
MC	HMC	MMC	QMC	DTC
Constant	-13.34 (-5.64)	-0.82 (-0.75)	-2.70 (0.63)	-2.22 (-5.78)
x_t	6.81 (6.18)	1.02 (2.48)	1.97 (1.17)	2.16 (9.22)
R^2	0.82	0.43	0.14	0.91
Adj R^2	0.80	0.36	0.041	0.90
DW	2.02	1.65	0.81	0.91
F-Statistic	38.2	6.19	1.38	85.05

LM Test <i>Prob</i>	0.12 (0.88)	0.94 (0.44)	5.85 (0.03)	5.52 (0.04)
ARCH Test	0.32 (0.58)	0.04 (0.84)	0.005 (0.944)	0.23 (0.64)
JB_{NOR}	1.12 (0.57)	0.95 (0.61)	0.98 (0.61)	0.79 (0.67)

Development expenditure as dependent variable local income as independent one.

Development expenditure was examined in regression relationship local income. Development expenditure is taken as a dependent variable and local municipal income as independent one. The relationship between municipal income as predictor and development expenditure as outcome variable is illustrated in the equation form.

$$\text{Development expenditure}_t = \alpha + \beta \text{Local income}_t + u_t \dots\dots\dots (VI)$$

The results reveal an increase of 0.66% for HMC, 0.30% for MMC, 1.98% for QMC and 0.30% for DTC, with one percent rise in local municipal income.

The results of residual diagnostic tests, goodness of fit and F-Statistics for all municipalities are tabled no. 6 below for all reported for development expenditures and municipal income including OZT share and local revenue.

Table 6
Development expenditure relationship with income components

OLS	Development Expenditure to Local Revenue			
MC	HMC	MMC	QMC	DTC
Constant	0.48 (1.68)	1.92 (11.9)	-2.57 (-1.65)	1.17 (3.99)
x_t	0.66 (5.72)	0.30 (4.92)	1.98 (3.23)	0.30 (1.73)
R^2	0.80	0.75	0.56	0.27
<i>Adj R</i> ²	0.77	0.72	0.51	0.18
<i>DW</i>	3.27	1.30	1.42	0.75
<i>F-Statistic</i>	32.7	24.25	10.46	3.02
LM Test <i>Prob</i>	3.02 (0.12)	0.39 (0.68)	1.10 (0.38)	1.42 (0.31)
ARCH Test	0.36 (0.56)	1.27 (0.29)	0.01 (0.89)	0.008 (0.93)
JB_{NOR}	1.01 (0.60)	0.14 (0.93)	1.06 (0.58)	0.34 (0.84)

Panel Data Analysis with Fixed Effect Method

After testing all possible relationship of municipal income and expenditures established under OLS regression for each individual municipality, the panel data analysis was done through application of fixed effect method. Both time series and entities data were collected and the possible relationship between income and expenditures were tested as presented below.

Municipal expenditure as dependent variable and income an independent one

When expenditures of all municipalities were taken as dependent variable and income as independent one under this fixed effect method, it predicted a positive and significant relationship between both predictor and outcome variables.

Table no.7 reveals fixed effect method estimates. It depicts that income has a positive effect on the local municipal expenditure. Thus, income estimate is positive and significant, positive at one percent significance level. Moreover, the estimates parameter is greater than unity implying. This explains that any change in municipal income results in larger changes in the expenditure of the municipalities.

Table 7

Municipal expenditure as dependent variable and income as independent one.	
All Councils	FEM Results
Constant	-1-0.112(-2.282) **
x	1.029(57.739) *
R^2	0.98
$Adj R^2$	0.98
F Statistic	3333.861

Municipal income a dependent variable and expenditure independent one

Finally, the income of all municipalities was taken as dependent variable and expenditure as independent one, this also explained significant positive relationship. This revised relationship is presented in the following equation form.

$$income_{it} = \alpha + \beta x_{it} + u_{it} \dots\dots\dots (VII)$$

The results are presented in the following table no 8. This also predicts a positive effect on income with a unit change in municipal expenditure. One percent raise in municipal expenditures raises municipal 0.96 percent.

Table 8
Municipal income as dependent and expenditure as independent one.

All Councils	FEM Results
Constant	-10.122(2.869) **
x	0.966(61.989) *
R^2	0.99
$Adj R^2$	0.99
F Statistic	3842.729

Hence, these fixed effect methods estimates are in line with the estimates of ordinary least square method. It confirms the conclusion that municipal expenditures have positive and significant effect on income. Results further revealed that the estimated model indicates up to ninety nine percent of variation in the dependent variable.

Conclusion

The findings of this paper conclude that a direct significant positive relationship is found between municipal income and expenditures. The regression results suggested that expenditure being dependent variable shows a significant rise with the increase of income. The percentage of this rise in regression relationship is more than actual municipal expenditures. The OLS regression analysis reveals that one percent rise in municipal expenditure raises the municipal income by 0.58% for HMC, 0.90% for MMC, 0.80% for QMC and 0.81% for DTC. Similarly, the panel data analysis done through Fixed Effects Methods indicates an overall expenditure rise of 1.02% with the 1% raise of municipal income. However, when income is taken as dependent variable to expenditure the results predicted a positive rise of 0.96% of income with a 1% rise in municipal expenditures.

When local municipal income is taken as a dependent variable then its impact on both services expenditures and development expenditures is positive. 01% rise in municipal income raises the services and development expenditures by 0.12 and 0.09 percent for HMC, 0.42 and 2.50 percent for MMC, 0.07 and 0.28 percent for QMC and 0.42 & 0.88 percent for DTC respectively.

Likewise, both services and development expenditures established significant relationships with local income when they are taken as dependent variable. One percent rise in services expenditures raises local income by 6.81% for HMC, 1.02% for MMC, 1.97% for

QMC and 2.16% for DTC. Similarly, one percent increase in development expenditures shows an increase in local income by 0.66% in HMC, 0.30% in MMC, 1.98% in QMC and 0.30% in DTC.

Hence, this fact cannot be rejected that the expenditures incurred in municipalities increase municipal income. The more a local council spends the greater it untaps the opportunity to increase local income. It uplifts the willingness of local citizens to pay municipal fees and taxes. Municipal spending also improves service delivery which encourages the users of municipal services to pay their taxes and bills. In other words, there are 'rewarding municipal services and spending of such services is municipal investment in other terms.

Thus, municipal spending not only contributes to improve local services, but they also improve citizens satisfaction and motivation to pay local bills and taxes. Thereby, this spending becomes an investment which increases municipal income. This cycle of municipal expenditures pushing municipal income upward is expected to move one unless it reaches at an equilibrium where municipal expenditures reach at the maximum level to not further increase local income.

Recommendations

It is recommended that local municipalities are required to spend more on municipal services to improve both service delivery and citizens satisfaction which ultimately contributes to increasing local income. The borderline for such municipal spending should be the point where local municipalities are unable generate additional possible revenue and where expenditures are about to surpass total municipal income.

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