Fiscal Decentralization and Corruption in Emerging and Developing Countries

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Abstract: This study focuses on the relationship between fiscal decentralization and ICRG index of corruption risk in both categories of emerging and developing countries, using a sample of 38 countries for the period 2000-2014. The aim is to focus on expenditure and revenue decentralization giving importance to the effects of subnational revenue mobilization on this correlation as: Tax revenue, Non tax revenue and fiscal imbalances. The study shows a significant and robust correlation between expenditure decentralization and the index of corruption: expenditure decentralization tends to reduce the risk of corruption in these two categories of countries. The impact of Tax Revenue is as important in this relationship as it helps reduce the risk even more. While revenue decentralization and especially non-tax revenue has no significant relationship with the index.

Keywords: Fiscal Decentralization, Corruption, Developing Countries, Emerging Countries

1. Introduction

Since the 1990s, many developing countries have engaged in the process of decentralization and regionalization to give local authorities more autonomy. The aim is to reduce the role of national government in favor of the subnational governments in local economic development programs. Fiscal decentralization is the cornerstone of any successful decentralization as it provides the subnational levels with the necessary resources to face decentralized expenditures.

Many studies aimed at showing the benefits of decentralization and expanding its advantages to different levels. As expressed in Tiebout [34], decentralization leads to a greater variety in public goods which are better adapted to responding to the local population. However, Prud’homme [29] and Tanzi [33] stressed the fact there are numerous imperfections in implementing local service, which might hinder achieving the benefits of decentralization.

According to the theory of fiscal federalism, first and second generation (Oates [25]), the effects of decentralization are classified according to the three branches of public economics defined by Musgrave [24]: resources allocation, income redistribution and economic stabilization.

The allocating efficiency is justified by the principle of political proximity and competition. The first is based on the approximation of the policy makers and citizens which helps know better the needs and preferences of the population (Hayek [16]), and also stressed the accountability and efficiency of local governments (Seabright [32]). The second is based on the inter-jurisdictional competition that decentralization introduced, leading to the improvement of the goods offer and public services adequacy to the preferences of inhabitants (Tiebout [34] and Oates [26]) and stimulating the search for efficiency by the local governments (Salmon [31]; Besley and Case [9]).

Approximating policy makers and citizens will certainly reduce the informational asymmetries, but this might lead to increasing the risk of corruption, especially in developing countries where control is weak.

However, empirical studies in the field generate controversial results. The first category views that decentralization increase corruption (Treisman [35]; Fan, Lin...
and Treisman [14]). The second category thinks that decentralization reduces corruption and makes better the quality of governance (Huther and Shah [17], Bareinstein and Mello [8], Fisman and Gatti [15]). But, those scholars have worked on a sample putting together developed, developing and emerging countries. Our study aims at distinguishing developed countries from developing and emerging ones for the period between 2000 and 2014 with a focus on the results of those two categories.

It postulates that the nature of the relationship between fiscal decentralization and corruption in developing and emerging countries differs from that of developed countries. With reference to the studies which show that the nature of revenue mobilization influences the relationship between decentralization and the quality of governance, we suppose there is also an effect impact on the relationship between fiscal decentralization and corruption.

So, does fiscal decentralization have an effect on corruption in emerging and developing countries? And, what might be the influence of the types of revenue mobilization on this correlation?

2. Literature Review

Potential effects of decentralization are a good allocation of public goods and services and a better efficiency of their production. These effects are the results of two mechanisms namely, proximity and competition.

Proximity between decision makers and citizens generates an informational advantage as shown in Hayek [16] and Oates [26]. Local governments are supposed to hold more information, to a lower cost, on members of their community and hence know more the poorest households, especially than the poverty varies from a jurisdiction to another. Thus, Alderman [3] shows that local policy makers have access to certain information not available to the local authority; hence they target better the poor population.

Moreover, proximity showed encourages the political participation of citizens and the responsibility of policy makers. Therefore, local governors, due to the pressure of citizens, are supposed to achieve a greater efficiency in providing public goods and services. However, this assumption supposes, in case of developing countries, that local democracy is to a good level. This also needs a certain level of literacy and political involvement of citizens, which seems a bit unrealistic in poor countries.

On the other hand, Prud'homme [29] and Bardhan [6] stress that there is the risk of more corruption that decentralization might result in developing countries. Local decision makers are more liable to set up personnel relations which could conduct to more corruption. Tanzi [33] believes that corruption is greater locally as long as it is stimulated by proximity of agents which favors personnel relations: an impetus to corruption. Obstacles in front of corruption are fewer locally as the necessary cooperation between politicians and the administration to carry out that is hindered by the autonomy of these two levels. Moreover, control and pressure from part of the media are of less importance and do not play the needed role. Decentralization, hence, generates an increase in corruption and possibility the cost of public services.

However, empirical studies demonstrate that there is an increase in corruption in countries with high rate of decentralization and others by demonstrating against improved governance and a weak rate of corruption. Treisman [35] and Fan, Lin and Treisman [14] by carrying a cross-sectional analysis of 54 and 80 countries, show that decentralized states have higher rates of corruption. Treisman [35] using variables on the basis of surveys of investment risks as well as a binary variable (federal or non-federal) concludes that federal countries are more "corrupt". The author suggests that competition from different autonomous levels of government to extract bribes from the same economic actors is likely to lead to "grazing". He shows preliminary evidence in support of this robust perspective, particularly among developing countries.

Fan, Lin and Treisman [14] use variables on corruption frequency and variables related to decentralization. They conclude that corruption is more common when the number of levels of government and local public employees increases.

There is, however, disagreement as several studies show that fiscal decentralization reduces corruption and improves the quality of governance by empowering local decision makers. Huther and Shah [17], using the index of quality of governance and the share of local public expenditure in total public expenditure show that there is a positive effect of fiscal decentralization on governance. They point to Pearson correlation coefficient of 0.532 between the absence of corruption and the extent of subnational spending, a factor statistically significant. This finding supports the idea that increased decentralization reduces corruption.

Following the same path, Bareinstein and Mello [8] show a positive effect of expenditure decentralization on governance. He then discusses the different revenue mobilization of local governments and indicators as governments are infected with types of revenue mobilization. Governance increases if revenue mobilization are not made up of own sub national governments revenues.

Enikolopov and Zhuravskaya [13] demonstrate that governance indicators will crescendo when decentralization is combined with political parties in power. Hence, fiscal decentralization has a positive effect on the quality of governance and access to education and health care. Political institutions are critical in determining these effects.

Fisman and Gatti [15] used a corruption index and the share of local public expenditure in total public expenditure, which has shown that fiscal decentralization is significantly associated with lower levels of corruption. They demonstrate that a higher degree of decentralization is significantly associated with low corruption measured by ICRG and the indices of RCG, and less confidence indices for IT and GCS. They also conclude that the effectiveness of decentralization in reducing corruption can vary significantly depending on how the decentralization took place. They open the question of how decentralization affects the type of corruption for future research.
Arikan [5] was interested in the issue in a competitive context of decentralization. He uses the index of perceived corruption and decentralization indicators where the level of corruption decreases as the number of jurisdictions compete. But the results are not very robust and suggest the hypothetical relationship between decentralization and corruption.

Altunbas and Thornton [4] support the view that fiscal decentralization has a positive impact on governance by reducing corruption. The authors base their research on variables of fiscal decentralization but also on the variable administrative and political decentralization. Their empirical results argue that a 1 standard deviation increase in fiscal decentralization is associated with a reduction of corruption between 0.33 (Tax Effort decentralization) and 0.54 (wage bill decentralization).

3. Methodology

3.1. Empirical Methodology

It is performed by a cross-country analysis based on the database of the International Monetary Fund (IMF: Government Finance Statistics (GFS)) that centralizes the

\[
coor_{kt} = \beta_0 + \beta_1 FDexp_{kt} + \beta_2 Ingdp_{kt} + \beta_3 Impop_{kt} + \beta_4 LAarea_{kt} + \beta_5 civlib_{kt} + \beta_6 imports_{gdp_{kt}} + \beta_7 expenses_{gdp_{kt}} + \epsilon_{kt} \tag{1}
\]

Equation (2) represents the relationship between the index of the risk of corruption and fiscal decentralization of revenue in emerging and developing countries.

\[
coor_{kt} = \beta_0 + \beta_1 FDrev_{kt} + \beta_2 Ingdp_{kt} + \beta_3 Impop_{kt} + \beta_4 LAarea_{kt} + \beta_5 civlib_{kt} + \beta_6 imports_{gdp_{kt}} + \beta_7 expenses_{gdp_{kt}} + \epsilon_{kt} \tag{2}
\]

Equation (3) represents the relationship between the index of the risk of corruption and expenditure decentralization variable by integrating varying types of local government revenue mobilization: Tax revenue, Non-tax revenue and the fiscal imbalance.

\[
coor_{kt} = \beta_0 + \beta_1 (FDexp_{kt} \times R) + \beta_2 Ingdp_{kt} + \beta_3 Impop_{kt} + \beta_4 LAarea_{kt} + \beta_5 civlib_{kt} + \beta_6 imports_{gdp_{kt}} + \beta_7 expenses_{gdp_{kt}} + \epsilon_{kt} \tag{3}
\]

3.2. Models

To find out the relationship between fiscal decentralization and corruption index there are two functions. The first function is interested in the expenditure decentralization variable and the second to the revenue decentralization variable.

Equation (1) represents the relationship between the index of the risk of corruption and fiscal decentralization of expenditure in emerging and developing countries.

\[
R: Relating to revenue mobilization indicators. We distinguish Tax Revenue defined as the share of local governments own tax revenues in total subnational revenues, Non Tax revenue is calculated by the share of non-tax revenues in total subnational revenues and Fiscal Imbalance is the transfers and grants from the central government to local governments to fill the gap between local expenditure and revenue.

We use control variables to minimize potential bias for measuring coefficient of fiscal decentralization. These variables are the norm in inter-country empirical literature on corruption.
\[ \ln(GDP)_{kt} \]: Logarithm of GDP per Capita reported to the constant value of 2011 dollars in the aim to control the level of economic development. Source: World Bank indicators.

civil liberties, \( \text{civlib}_{kt} \): Index of civil liberties to capture the extent to which a free press and free political associations could act as a check on corrupt public sector. First developed by Gastil, it is calculated by Freedom House with a score of 1 (more liberties) to 7 (least Freedoms).

\[ \ln(\text{pop})_{kt} \]: Total population. Source: World Bank indicators.

\[ \text{LNArea}^{\text{gdp}}_{kt} \]: The area of the country is an important variable because larger countries could adopt more decentralized tax systems to better meet the diverse preferences of their citizens. Source: World Bank indicators.

\[ \text{imports}^{\text{gdp}}_{kt} \]: Imports as a percentage of Gross Domestic Product (openness of the economy) is a frequently used variable in studies of corruption as an explanatory variable or control as suggested by Ades and Di Tella [1], Fisman and Gatti [15], Arikan [5] and Fan, Lin and Treisman [14]. Leite and Weidmann [21] explain that countries with fewer trade restrictions tend to have less corruption. Source: World Bank indicators.

\[ \epsilon_{kt} \]: Residue of the model, it represents other variables not taken into account in this model.

### 3.4. Collinearity Test of Variables

Collinearity test of variables of the first (1) and second (2) function confirms our choice of variables since the correlation between the exogenous variables is acceptable which does not injure the reliability of our model. (Tables 1 and 2)

The same as regards the variables related to the introduction of different types of revenue mobilization. This can be seen in tables 3.

### Table 1. Collinearity test of the variables for the function (1).

| EXPENSEGDP | CIVLIB | FDEXP | IMPORTSGDP | LANDAREA | LNGDP | LNPOP |
|-----------|--------|-------|------------|----------|-------|-------|
| EXPENSEGDP | 1.000000 | 0.000121 | 0.290271 | 0.318962 | 0.120433 | 0.34275 | -0.077159 |
| CIVLIB | 0.000121 | 1.000000 | 0.051905 | 0.025964 | 0.186516 | -0.006491 | 0.100519 |
| FDEXP | 0.290271 | 0.051905 | 1.000000 | -0.235966 | 0.454761 | 0.325671 | 0.411749 |
| IMPORTSGDP | 0.318962 | 0.025964 | -0.235966 | 1.000000 | -0.385971 | 0.036427 | -0.591008 |
| LANDAREA | 0.120433 | 0.186516 | 0.454761 | -0.385971 | 1.000000 | 0.212479 | 0.469334 |
| LNGDP | 0.344275 | -0.006491 | 0.325671 | 0.036427 | 0.212479 | 1.000000 | -0.035411 |
| LNPOP | -0.077159 | 0.100519 | 0.411749 | -0.591008 | 0.469334 | -0.035411 | 1.000000 |

### Table 2. Collinearity test of the variables for the function (2).

| FDREV | CIVLIB | EXPENSEGDP | LANDAREA | LNGDP | LNPOP | IMPORTSGDP |
|-------|--------|------------|----------|-------|-------|------------|
| FDREV | 1.000000 | -0.001576 | 0.279352 | 0.385345 | 0.267677 | 0.492418 | -0.263158 |
| CIVLIB | -0.001576 | 1.000000 | -0.010850 | 0.182076 | -0.024806 | 0.103766 | 0.030787 |
| EXPENSEGDP | 0.279352 | -0.010850 | 1.000000 | 0.123772 | 0.354975 | -0.080019 | 0.318559 |
| LANDAREA | 0.385345 | 0.182076 | 0.123772 | 1.000000 | 0.210234 | 0.471494 | -0.385927 |
| LNGDP | 0.267677 | -0.024806 | 0.354975 | 0.210234 | 1.000000 | -0.027788 | 0.032466 |
| LNPOP | 0.492418 | 0.103766 | -0.008019 | 0.471494 | -0.027788 | 1.000000 | -0.594361 |
| IMPORTSGDP | -0.263158 | 0.030787 | 0.318559 | -0.035411 | 1.000000 | | |

### Table 3. Collinearity test of the variables for the function (3).

| TAXREV | FDEXP | CIVLIB | EXPENSEGDP | IMPORTSGDP | LNGDP | LANDAREA | LNPOP |
|--------|-------|--------|------------|------------|-------|----------|-------|
| TAXREV | 1.000000 | 0.137617 | 0.132730 | 0.228581 | 0.228504 | 0.221613 | 0.233961 | -0.030452 |
| FDEXP | 0.137617 | 1.000000 | 0.051905 | 0.290271 | -0.235966 | 0.325671 | 0.454761 | 0.411749 |
| CIVLIB | 0.312730 | 0.051905 | 1.000000 | 0.000121 | 0.025964 | -0.006491 | 0.186516 | 0.100519 |
| EXPENSEGDP | 0.228581 | 0.290271 | 0.000121 | 1.000000 | 0.318962 | 0.344275 | 0.120433 | -0.077159 |
| IMPORTSGDP | 0.228504 | 0.290271 | 0.000121 | 1.000000 | 0.318962 | 0.344275 | 0.120433 | -0.077159 |
| LNGDP | 0.221613 | 0.325671 | -0.006491 | 0.344275 | 0.036427 | 1.000000 | 0.212479 | -0.035411 |
| LANDAREA | 0.233961 | 0.454761 | 0.186516 | 0.120433 | -0.385971 | 0.212479 | 1.000000 | 0.469334 |
| LNPOP | -0.030452 | 0.141749 | 0.100519 | -0.077159 | -0.591008 | -0.035411 | 0.469334 | 1.000000 |
| NOTAXREV | 1.000000 | -0.137617 | -0.312730 | -0.228581 | -0.233961 | -0.228504 | -0.221613 | 0.030452 |
4. Results and Discussion

4.1. Fiscal Decentralization and the Risk of Corruption

The first analysis of expenditure decentralization index FDEXP and corruption index COOR in emerging and developing countries (function 1) reveals at the first time that our analysis is significant. Table 4 shows that the choice of variables is optimal as well as the existence of a significant relationship between our dependent and independent variables. The results show the relevance of our econometric model, hence the need to adopt the above analysis.

After using the Haussman test, the model is the fixed effect one that shows that there's a positive and significant correlation of expenditure decentralization index FDEXP on of the index COOR. Knowing that when the index value improves the risk of corruption decreases, it can be argued that an 1 deviation increase of expenditure decentralization reduces the risk of corruption of 1.21 (Table 4, column (1)).

This echoes the results of Altunbas and Thornton [4] Fisman and Gatti [15], who both studied the impact of decentralization on ICRG corruption index and demonstrate the impact of decentralization on the reduction of corruption risk.

The significant relationship between corruption and the development LNGDP shows that the development of the country affects the corruption index in a negative way. The higher GDP countries have the greater risk of corruption. A 1 deviation of log GDP increases the risk of 0.3.

Correlations between corruption index and civil liberties CIVLIB, imports as percentage of GDP IMPORTSGDP, the land area LNPOP area and population are not significant and negative. When relationship with expenses as a percentage of GDP is positive, this means reducing the risk.

The correlation between revenue decentralization and ICRG corruption index (function 2) is also positive but not significant and the model is the fixed effect. When the revenue decentralization index increases then the risk of corruption decreases (Table 4, column (2)). In this analysis the meaningful control variable is logPIB which means that the countries where GDP is significant, corruption risk increases (coefficient 0.3). The other control variables are not significant and negative except the size of government, which is also not significant but positive.

4.2. The Impact of Revenue Mobilization Indicators

We are interested in the impact of different revenue mobilization indicators on the relationship between expenditure decentralization and ICRG corruption index. The hypothesis is concerned that corruption is not only influenced by expenditure decentralization but also by the nature of revenue mobilization (Bareinstein and Mello [8]). Our analysis focuses on Tax Revenue, Non tax Revenue and Fiscal imbalance (function 3).

The results shows that tax revenues combined with the expenditure decentralization FDEXP * TAXREV have significant impact on the value of the risk of corruption. This leads us to conclude that the combined tax revenue decentralization has more influence on reducing the risk of corruption. A 1 deviation increase of the variable "expenditure decentralization * tax revenue" reduces the risk of corruption by 2.32 (Table 4, column (3.1)). The two other types of revenue mobilization are not significantly correlated with the corruption index (Tables 4, column (3.2) and (3.3)).

Bareinstein and Mello [8] in their analysis are interested in the influence of different revenue mobilization combined with expenditure decentralization index on governance. Their results were quite different from our results. The non-tax revenues combined with expenditure decentralization have the greatest effect in improving governance.
Table 4. Fixed Effect Estimation of correlation between fiscal decentralization and risk of corruption ICRG.

| Dependant Variable: ICRG index of corruption: Coor | 1         | 2         | 3.1       | 3.2       | 3.3       |
|--------------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| FExp                                             | 1.216711*** | -0.482823 |           |           |           |
| FRev                                             | 0.599639   | -0.482167 |           |           |           |
| FExp*TAXREV                                      |           |           | 2.325584*** | -0.717171 |           |
| FExp*NONTAXREV                                    |           |           |           | 0.282245  | -0.617155 |
| FExp*FISCALIMBA                                   |           |           |           |           | 0.681212  |
| LNGDP                                            |           |           |           |           |           |
| -0.306986**                                     | -0.312294** | -0.082061 | -0.348489** | -0.323592** |           |
| -0.141859                                       | -0.143747  | -0.159205 | -0.153592  | -0.149076  |           |
| -0.07209                                        | -0.11163   | -0.265808 | -0.083729  | -0.006912  |           |
| -0.410503                                        | -0.418126  | -0.410343 | -0.41863   | -0.416469  |           |
| LANDAREA                                         |           |           |           |           |           |
| -6.86 E-05                                       | 8.30 E-05** | 4.16 E-05 | 4.52 E-05  |           | 4.3 E-05  |
| CIVILIB                                           |           |           |           |           |           |
| -0.038189                                        | -0.029818  | -0.036949** | -0.02327  | -0.021009  |           |
| -0.050819                                        | -0.051464  | -0.050283 | -0.050510  | -0.050931  |           |
| EXPENSEGDG                                       |           |           |           |           |           |
| 0.014293**                                     | 0.012510*  | 0.014377  | 0.012746*  | -0.001085  |           |
| -0.007429                                        | -0.007509  | -0.007371 | -0.007479  | -0.003322  |           |
| IMPORTSGDP                                        |           |           |           |           |           |
| -0.002594                                        | -0.001913  | -0.004706 | -0.001305  |           |           |
| -0.003303                                        | -0.003377  | -0.003403 | -0.003314  |           |           |
| Constant                                           |           |           |           |           |           |
| 110.9503*                                        | 132.0850** | 160.4793*** | 149.2168** | 144.7378** |           |
| R-squared                                          | 0.749482  | 0.743039  | 0.752677  | 0.746416  | 0.743171  |
| Adjusted R-squared                                | 0.7146    | 0.706801  | 0.71824   | 0.709057  | 0.708334  |
| s.E. of regression                                 | 0.311739  | 0.315869  | 0.309744  | 0.314751  | 0.315142  |
| Hannan-Quinn criter                                | 0.815599  | 0.844804  | 0.802762  | 0.834835  | 0.830654  |
| Durbin-Watson Stat                                 | 0.882476  | 0.86795  | 0.895365  | 0.85490  | 0.829806  |
| Observations                                        | 361       | 361       | 361       | 361       | 361       |

Table made according to the estimation results of E-Views
Note: White robust standard errors are in parentheses below the coefficients. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively. The corruption index has been rescaled to take on values between 6 (least corrupt) and 0 (most corrupt).

5. Conclusion

The special characteristic of our study is that it is interested in emerging and developing countries which should, as the literature goes, have increased corruption following decentralization and the use of multivariate controls. According to Prud'homme [29] and Bardhan [6], the risk of corruption is more important following the decentralization in developing countries. Local decision makers can better establish privileged relationships with local interest groups and are also more sensitive to their pressure. Tanzi [33] also believes that corruption is stronger at the local level because it is stimulated by the proximity of agents that promotes personal relationships, more conducive to corruption.

This has not been verified in our study, for the period 2000-2014, which shows that the decentralization of expenditures has a significant reduction effect of corruption risk in emerging and developing countries. This correlation is accelerated if the decentralization of expenditures is combined with local tax revenues. The relationship is not significant for the decentralization of revenue and two sources of revenue mobilization: non-tax revenues and fiscal imbalance.

The results of our analysis join those of Altnunbas and Thornton [4], Arikan [5], Fisman and Gatti [15], Enikolopov and Zhuravskaya [13], Bareinstein and Mello [8], Huther and Shah [17] that demonstrate decentralization plays the lead role in improving governance in general and reducing corruption.

The principle is that the effects of decentralization on the principle of proximity increase the awareness and responsibility of local officials to be more efficient. This encourages them to increase the quality of governance in general and thereby reduce the risk of corruption. Their major concern remains the maximization of the probability of re-election (Persson and Tabellini [27]). Jin et al. [18] further emphasize that the competition between localities generally discourages governments from making interventionist policies and distortions. Inter-territorial competition, therefore, predicted lower levels of corruption in decentralized economies. Indeed, Weingast [37] and Montinola, Yingyi and Weingest [23] argue that fiscal decentralization means that economic agents generate the ability to let the most corrupt areas, which would tend to improve governance. Inman and
Rubinfeld [22] and Mello [11] argue that fiscal decentralization increases social capital and encourage political participation. The conclusion is that decentralization in emerging and developing countries could generate benefits in the period 2000-2014. Corruption is less and good governance is generally better. This joins Dreher [12] who notes that fiscal decentralization is consistent with improvement in a number of key indicators of governance mainly in low-income countries.

Appendix

Table A1. OLS estimation Results: index of corruption and fiscal decentralization indicators.

The model 1

| Variable      | Coefficient | Std. Error | t-Statistic | Prob.  |
|---------------|-------------|------------|-------------|--------|
| FDEXP         | 0.699808    | 0.198647   | 3.522878    | 0.0005 |
| EXPENSEGDP    | 0.002051    | 0.003785   | 0.541827    | 0.5883 |
| CIVLIB        | -0.048148   | 0.022451   | -2.144540   | 0.0327 |
| IMPORTSGDP    | -0.003694   | 0.001961   | -1.883639   | 0.0604 |
| LANDAREA      | -6.38E-08   | 1.05E-08   | -6.048353   | 0.0000 |
| LNGDP         | 0.193831    | 0.037114   | 5.222528    | 0.0000 |
| LNPPOP        | 0.073728    | 0.027293   | 2.701321    | 0.0072 |
| C             | 0.0000      | -0.672857  | -1.080260   | 0.2808 |

R-squared 0.216044
Adjusted R-squared 0.200498
S.E. of regression 0.622866
Akaike info criterion 2.096376
Schwarz criterion 1.592967
Hannan-Quinn criter. 0.0000
Durbin-Watson stat 0.287843
Log likelihood -273.3460
F-statistic 13.89722

The model 2

| Variable      | Coefficient | Std. Error | t-Statistic | Prob.  |
|---------------|-------------|------------|-------------|--------|
| FDREV         | 0.852169    | 0.185177   | 4.601912    | 0.0000 |
| CIVLIB        | -0.033188   | 0.022386   | -1.482557   | 0.1391 |
| EXPENSEGDP    | -0.000531   | 0.003782   | -0.140474   | 0.8884 |
| LANDAREA      | -6.00E-08   | 1.02E-08   | -5.898287   | 0.0000 |
| LNGDP         | 0.207275    | 0.036447   | 5.687039    | 0.0000 |
| LNPPOP        | 0.045239    | 0.028165   | 1.606184    | 0.1091 |
| IMPORTSGDP    | -0.003790   | 0.001926   | -1.967862   | 0.0499 |
| C             | -0.342047   | 0.626954   | -0.545570   | 0.5857 |

R-squared 0.240494
Adjusted R-squared 0.20002014
S.E. of regression 0.622866
Akaike info criterion 2.103058
Schwarz criterion 1.561415
Hannan-Quinn criter. 0.0000
Durbin-Watson stat 0.287843
### The model 3.2

**Dependent Variable:** COOR  
**Method:** Panel Least Squares  
**Sample:** 20002014  
**Periods included:** 15  
**Cross-sections included:** 38  
**Total panel (unbalanced) observations:** 361

| Variable               | Coefficient | Std. Error | t-Statistic | Prob.   |
|------------------------|-------------|------------|-------------|---------|
| FDEXP*NONTAXREV        | 0.900560    | 0.295005   | 3.052692    | 0.0024  |
| EXPENSEGDP             | 0.003779    | 0.003720   | 1.015731    | 0.3105  |
| CIVLIB                 | -0.029386   | 0.023518   | -1.249535   | 0.2123  |
| LANDAREA               | -5.77E-08   | 1.03E-08   | -5.576439   | 0.0000  |
| LNGDP                  | 0.209677    | 0.036547   | 5.737104    | 0.0000  |
| LNPOP                  | 0.081394    | 0.027060   | 3.007898    | 0.0028  |
| IMPORTSGDP             | -0.002606   | 0.002021   | -1.289537   | 0.1981  |
| C                      | -1.087070   | 0.602021   | -1.805701   | 0.0718  |
| **R-squared**          | 0.209355    |            |             | 2.096376|
| **Adjusted R-squared** | 0.193676    |            |             | 0.583530|
| **S.E. of regression** | 0.523984    |            |             | 1.567200|
| **Sum squared resid**  | 96.91943    |            |             | 1.653381|
| **Log likelihood**     | -274.8797   |            |             | 1.601464|
| **F-statistic**        | 13.35296    |            |             | 0.273536|
| **Prob (F-statistic)** | 0.000000    |            |             |         |

### The model 3.3

**Dependent Variable:** COOR  
**Method:** Panel Least Squares  
**Sample:** 20002014  
**Periods included:** 15  
**Cross-sections included:** 38  
**Total panel (unbalanced) observations:** 361

| Variable               | Coefficient | Std. Error | t-Statistic | Prob.   |
|------------------------|-------------|------------|-------------|---------|
| FDEXP*FIMB             | 0.675820    | 0.337576   | 2.001981    | 0.0460  |
| IMPORTSGDP             | -0.002174   | 0.001873   | -1.160762   | 0.2465  |
| LANDAREA               | -5.24E-08   | 1.02E-08   | -5.111665   | 0.0000  |
| LNGDP                  | 0.233837    | 0.034914   | 6.697429    | 0.0000  |
| LNPOP                  | 0.090968    | 0.027252   | 3.338015    | 0.0009  |
| CIVLIB                 | -0.039673   | 0.023505   | -1.687881   | 0.0923  |
| C                      | -1.293667   | 0.601768   | -2.149777   | 0.0322  |
| **R-squared**          | 0.193004    |            |             | 2.096376|
| **Adjusted R-squared** | 0.179327    |            |             | 0.583530|
| **S.E. of regression** | 0.528626    |            |             | 1.582129|
| **Sum squared resid**  | 98.92369    |            |             | 1.657537|
| **Log likelihood**     | -278.5743   |            |             | 1.612109|
| **F-statistic**        | 14.11069    |            |             | 0.265894|
| **Prob (F-statistic)** | 0.000000    |            |             |         |
Table A2. Fixed Effects Estimation Results: index of corruption and fiscal decentralization indicators.

**The model 1**

| Variable      | Coefficient | Std. Error | t-Statistic | Prob.  |
|---------------|-------------|------------|-------------|--------|
| FDEXP         | 1.216711    | 0.482823   | 2.519994    | 0.0122 |
| EXPENSEGDP    | 0.014293    | 0.007429   | 1.924091    | 0.0552 |
| CIVILIB       | -0.038189   | 0.050819   | -0.751474   | 0.4529 |
| IMPORTSGDP    | -0.002594   | 0.003303   | -0.785365   | 0.4328 |
| LANDAREA      | -6.86E-05   | 4.37E-05   | -1.571156   | 0.1171 |
| LNGDP         | -0.306986   | 0.141859   | -2.164028   | 0.0312 |
| LNPOR         | -0.072090   | 0.410503   | -0.175615   | 0.8607 |
| C             | 110.9503    | 65.86796   | 1.684436    | 0.0931 |
| C             | 110.9503    | 65.86796   | 1.684436    | 0.0931 |

Effects Specification

| R-squared    | 0.749482    | Mean dependent var | 2.096376 |
| Adjusted R-squared | 0.714600    | S.D. dependent var  | 0.583530 |
| S.E. of regression  | 0.311739    | Akaike info criterion | 0.622868 |
| Sum squared resid | 30.70919    | Schwarz criterion   | 1.107632 |
| Log likelihood    | -67.42776   | Hannan-Quinn criter. | 0.815599 |
| F-statistic       | 21.48604    | Durbin-Watson stat  | 0.882476 |
| Prob (F-statistic)| 0.000000    |                     |          |

**The model 2**

| Variable      | Coefficient | Std. Error | t-Statistic | Prob.  |
|---------------|-------------|------------|-------------|--------|
| FDREV         | 0.590639    | 0.482167   | 1.243635    | 0.2146 |
| CIVLIB        | -0.029818   | 0.051464   | -0.579404   | 0.5627 |
| EXPENSEGDP    | 0.012510    | 0.007509   | 1.665899    | 0.0967 |
| IMPORTSGDP    | -0.001913   | 0.003377   | -0.566472   | 0.5715 |
| LANDAREA      | -8.30E-05   | 4.39E-05   | -1.890358   | 0.0596 |
| LNGDP         | -0.312294   | 0.143747   | -2.172527   | 0.0306 |
| LNPOR         | -0.111630   | 0.418126   | -0.266978   | 0.7897 |
| C             | 132.0850    | 65.36059   | 2.020867    | 0.0441 |

Effects Specification

| R-squared    | 0.749482    | Mean dependent var | 2.096376 |
| Adjusted R-squared | 0.714600    | S.D. dependent var  | 0.583530 |
| S.E. of regression  | 0.311739    | Akaike info criterion | 0.622868 |
| Sum squared resid | 30.70919    | Schwarz criterion   | 1.107632 |
| Log likelihood    | -67.09476   | Hannan-Quinn criter. | 0.815599 |
| F-statistic       | 20.50439    | Durbin-Watson stat  | 0.867950 |
| Prob (F-statistic)| 0.000000    |                     |          |
**The model 3.1**

| Variable          | Coefficient | Std. Error | t-Statistic | Prob. |
|-------------------|-------------|------------|-------------|-------|
| FDEXP*TAXREV      | 2.325584    | 0.717171   | 3.242718    | 0.0013|
| CIVLIB            | -0.036949   | 0.050283   | -0.734823   | 0.4630|
| EXPENSEGDP        | 0.014377    | 0.007371   | 1.950469    | 0.0520|
| IMPORTSGDP        | -0.004706   | 0.003403   | -1.383018   | 0.1676|
| LANDAREA          | -0.000100   | 4.16E-05   | -2.405893   | 0.0167|
| LNPPO             | -0.265808   | 0.410343   | -0.647770   | 0.5176|
| LNGDP             | -0.082061   | 0.159205   | -0.515444   | 0.6066|
| C                 | 160.4793    | 62.43354   | 2.570402    | 0.0106|

**Effects Specification**

- Cross-section fixed (dummy variables)
- R-squared: 0.752677
- Adjusted R-squared: 0.744616
- S.E. of regression: 0.675671
- S.D. dependent var: 0.583530
- Mean dependent var: 2.096376
- Akaike info criterion: 0.610031
- Schwarz criterion: 1.094794
- Hannan-Quinn crit.: 0.802762
- Durbin-Watson stat: 0.854940
- Prob (F-statistic): 0.000000

**The model 3.2**

| Variable          | Coefficient | Std. Error | t-Statistic | Prob. |
|-------------------|-------------|------------|-------------|-------|
| FDEXP*NONTAXREV   | 0.282245    | 0.617155   | 0.457332    | 0.6477|
| EXPENSEGDP        | 0.012746    | 0.007479   | 1.704290    | 0.0893|
| CIVLIB            | -0.023270   | 0.051051   | -0.455827   | 0.6488|
| LANDAREA          | -9.31E-05   | 4.52E-05   | -2.061382   | 0.0401|
| LNGDP             | -0.348489   | 0.153592   | -2.268928   | 0.0239|
| LNPOP             | -0.083729   | 0.418630   | -0.200006   | 0.8416|
| IMPORTSGDP        | -0.001305   | 0.003314   | -0.393388   | 0.6939|
| C                 | 149.2168    | 68.25861   | 2.186051    | 0.0295|

**Effects Specification**

- Cross-section fixed (dummy variables)
- R-squared: 0.744616
- Adjusted R-squared: 0.735671
- S.E. of regression: 0.675671
- S.D. dependent var: 0.583530
- Mean dependent var: 2.096376
- Akaike info criterion: 0.610031
- Schwarz criterion: 1.094794
- Hannan-Quinn crit.: 0.802762
- Durbin-Watson stat: 0.854940
- Prob (F-statistic): 0.000000
Dependent Variable: COOR
Method: Panel Least Squares
Sample: 20002014
Periods included: 15
Cross-sections included: 38
Total panel (unbalanced) observations: 361

| Variable          | Coefficient       | Std. Error | t-Statistic | Prob.  |
|-------------------|-------------------|------------|-------------|--------|
| FDEXP*FIMB        | 0.681212          | 0.609618   | 1.117440    | 0.2647 |
| IMPORTSGDP        | -0.001085         | 0.003322   | -0.326482   | 0.7443 |
| LANDAREA          | -9.10E-05         | 4.38E-05   | -2.078296   | 0.0385 |
| LNGDP             | -0.323592         | 0.149076   | -2.170655   | 0.0307 |
| LNPPO             | -0.006912         | 0.416469   | -0.016597   | 0.9868 |
| CIVLIB            | -0.020100         | 0.050931   | -0.412496   | 0.6803 |
| C                 | 144.7378          | 65.9838    | 2.193533    | 0.0290 |

Effects Specification

Cross-section fixed (dummy variables)
R-squared 
Adjusted R-squared
S.E. of regression
Sum squared resid
S.D. dependent var
S.E. of regression
F-statistic

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