

**VII JORNADAS  
IBEROAMERICANAS DE  
FINANCIACIÓN LOCAL**

*Los días 5 y 6 de  
septiembre de 2017 en  
la ciudad de Cartagena,  
Colombia*

**An indicator of municipal fiscal  
effort on revenues related to real  
estate value and valorization with  
application in Brazil**

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## Main question


- ▶ How much could greater municipal fiscal effort on these revenues based on real estate value and valorization help close the financing gap for needed infrastructure and social programs?



## Main question

To help address this question, we develop and evaluate the usefulness of a Fiscal Effort Index for three municipal revenues based on real estate value and valorization:

- Real estate property tax
  - IPTU/ Imposto Predial e Territorial Urbano
- Real estate transfer tax
  - ITBI/ Imposto sobre Transmissão de Bens Imobiliários
- Betterment levies
  - Contribuição de melhoria




## Need to close the financing gap

- Greater fiscal effort on these three municipal revenues could help to meet the enormous need for resources
  - Investments of over US\$40 billion needed just potable water, waste water, solid waste and drainage
  - Investment needs for other urban infrastructure sectors are also similarly high

## Financing gap increasing due to the Great Recession


### Brazil: Public sector investment by government level: 2009/2017

- ▶ Due to the Great Recession (2014/2016):
  - Brazil's public sector investment dropped by almost US\$20 billion (36.2%) for the national, state and local governments during 2009/2017:
    -
  - Municipal public investment dropped by:
    - US\$3.7 billion (31.9%) during 2009/2017
    - Municipalities still accounted for about a quarter of total public sector investment in 2017



**Accurate  
indicator of  
municipal fiscal  
effort needed**


- ▶ Because municipal fiscal performance is usually quite diverse, empirical analysis with accurate indicators is essential
  - The lack of adequate indicators can cause focus on a few bad municipal performers covered by the press
  - This can cause policy makers to see municipalities as generators of financing gaps,
    - rather than potential agents for closing them



## Criteria for evaluation of the Fiscal Effort Index

### Should be:

- Grounded in research
- Sensitive to the underlying phenomenon and statistically sound
- Intelligible and easily interpreted
- Timely
- Consistent over time



## Criteria for evaluation of the Fiscal Effort Index


### Should also:

- Allow for analysis of subgroups
- Relate well to other indicators (e.g., creditworthiness)
- Assist in financial risk analysis

### Fiscal Effort Index should assist a:


- Policy maker wishing to improve municipal fiscal performance
- Financial entity seeking to develop a portfolio of municipal loans or bonds
  - especially when using tools of modern risk analysis





## **Municipal revenues based on real estate value and valorization**

- ▶ The real estate property and transfer taxes are important traditional revenue sources for Brazilian municipalities
- ▶ The real estate transfer tax is important, but is often ignored
  - In 2013, revenue from the real estate transfer tax exceeded that of the property tax in 43% of Brazil's municipalities (Afonso et al. 2016)
- ▶ A number of Brazilian municipalities use betterment levies effectively (Pereira et al. 2012)



**Strong synergy in  
revenue collection:  
The importance of  
the cadaster**

- Important synergy in the collection of these three revenues:
  - Real estate property and transfer taxes
  - Betterment levies
- All are based on real estate value or valorization
- Their effective collection depends on a modern cadaster

**Strong synergy in  
revenue collection:  
The importance of  
the cadaster**

- Data on real estate sales prices from the transfer tax can serve to update the cadaster used for the property tax
- Cadastral values serve to check against “low balling” sales prices to reduce the transfer tax
- Cadastral data can be used to estimate the valorization generated by public interventions
  - needed to effectively apply betterment levies and other value capture instruments

**Methodology:  
Models of  
municipal  
fiscal effort**

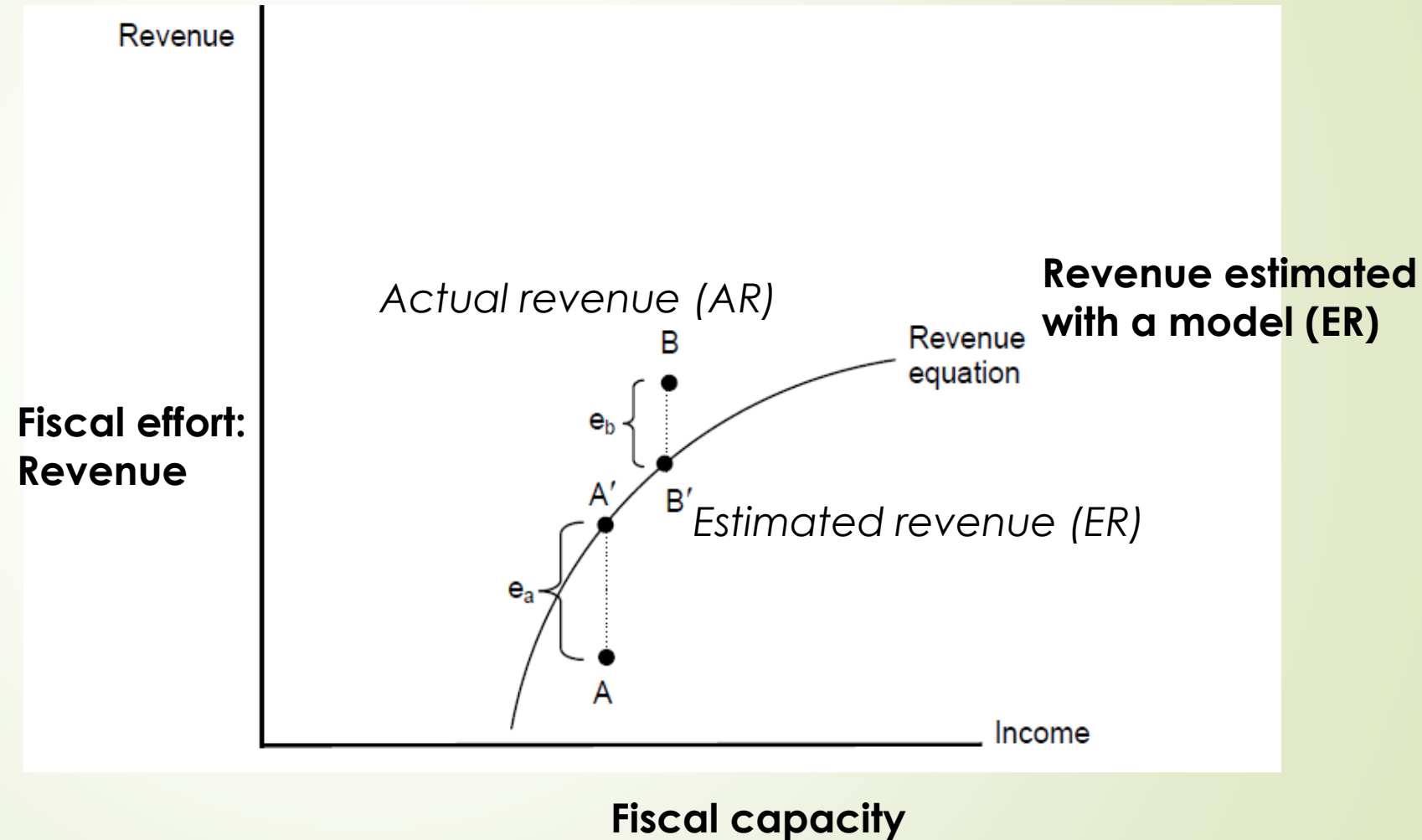
- Fiscal Effort Index is based on the analysis of the relationship between:
  - Fiscal effort: Own-source revenues per capita
  - Fiscal capacity: Measured by:
    - Municipal GDP per capita
    - Indicators of socioeconomic development
    - Structure of the local economy


*See: Assessing Local Government Revenue Raising Capacity by the Australian Government Productivity Commission (AGPC 2008)*

**Chart 1. The relationship between fiscal effort and fiscal capacity: Two hypothetical municipalities: A and B**

**Methodology:  
Models of municipal  
fiscal effort**

Revenue estimated with the fiscal effort model (ER) serves as a **benchmark**





**Methodology:**  
**Models of**  
**municipal fiscal**  
**effort**

**We first calibrate the model for the selected municipalities (j):**

$$AR_j = f(FC_j) \quad j = 1, 2, n$$

**Where:**

- $AR_j$  = Actual Revenue per capita ( $AR_j$ ) for the total real estate property and transfer tax and betterment levies
- $FC_j$  = Independent variables measuring the Fiscal Capacity of the municipality  $j$  ( $FC_j$ )

## **Methodology:** **Fiscal Effort Index**

We then use the model to generate **Estimated Municipal Revenue (ER<sub>j</sub>)** for each municipality

For municipality j:

**Fiscal Effort Index (FEI<sub>j</sub>)** = Actual Revenue (AR<sub>j</sub>) / Estimated Revenue (ER<sub>j</sub>)


$$\mathbf{FEI_j = AR_j / ER_j} \quad j = 1, 2, n$$



## Methodology: Fiscal Effort Index

- ▶ **Estimated Municipal Revenue ( $ER_j$ )** serves as a benchmark for municipal fiscal effort
  - If the  $FEI_j$  is less than 1, fiscal effort is below the benchmark
  - If the  $FEI_j$  is greater than 1, effort is greater than the benchmark
  - For example, a  $FEI_j$  of 1.35 indicates that the fiscal effort of municipality  $j$  ( $AR_j$ ) is 35% higher than its expected revenue ( $ER_j$ ) estimated using the model





## Data Description: Municipal revenues and fiscal capacity

- ▶ **Municipal revenue** (dependent variable):
  - Website of the national secretary of the treasury: Real estate taxes and betterment levies
- ▶ **Indicators of Municipal fiscal capacity** (independent variables):
  - Municipal GDP per capita (GDP)
  - Municipal Development Index (MDI):
    - Composite indicator covering employment and income, education and health
  - Municipal agricultural GDP/ Total municipal GDP (%AG)


## Data Description: Sample of municipalities

### ► The sample of municipalities:

- Target: Municipalities with 50,000+ population in 2010 census
- Final for municipalities reporting their financial data and meeting criteria:
  - 530/531 municipalities for 2006 and 2010, respectively

**Reais (R\$) of 2012 constant value** using the GDP implicit deflator

**Exchange rate** for 2012: US\$1 = 1.95



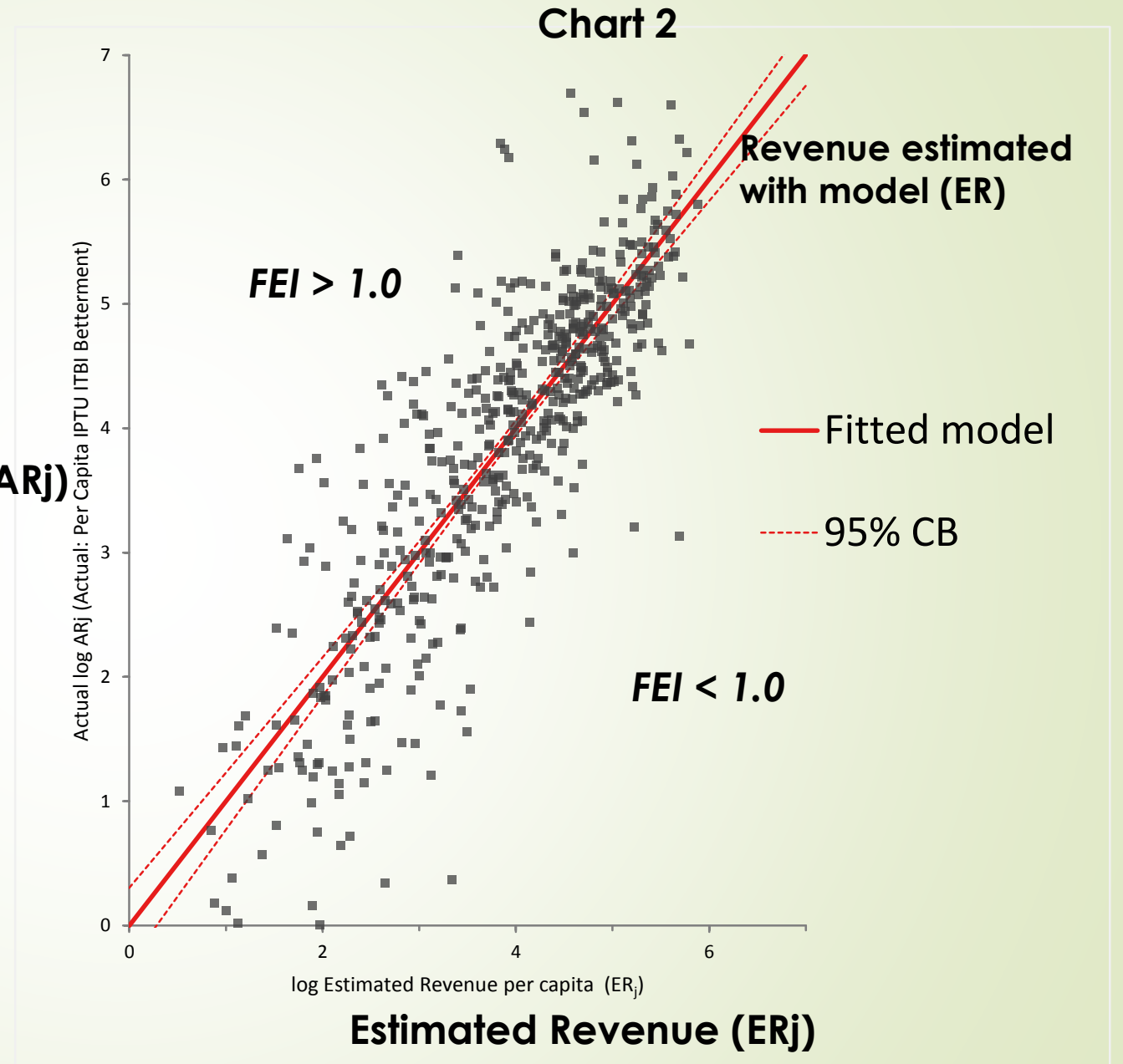
## Data analysis: Calibration of the Models

- ▶ We calibrated the model using OLS regression for 2006 and 2010
  - The log-log form provided the best fit, yielding a  $R^2$  of 0.71 in 2006 and 0.72 in 2010
  - The coefficients of the independent variables are statistically significant

Data analysis:  
Calibration of the Model:  
log-log form: 2010

Actual Revenue (AR<sub>j</sub>)

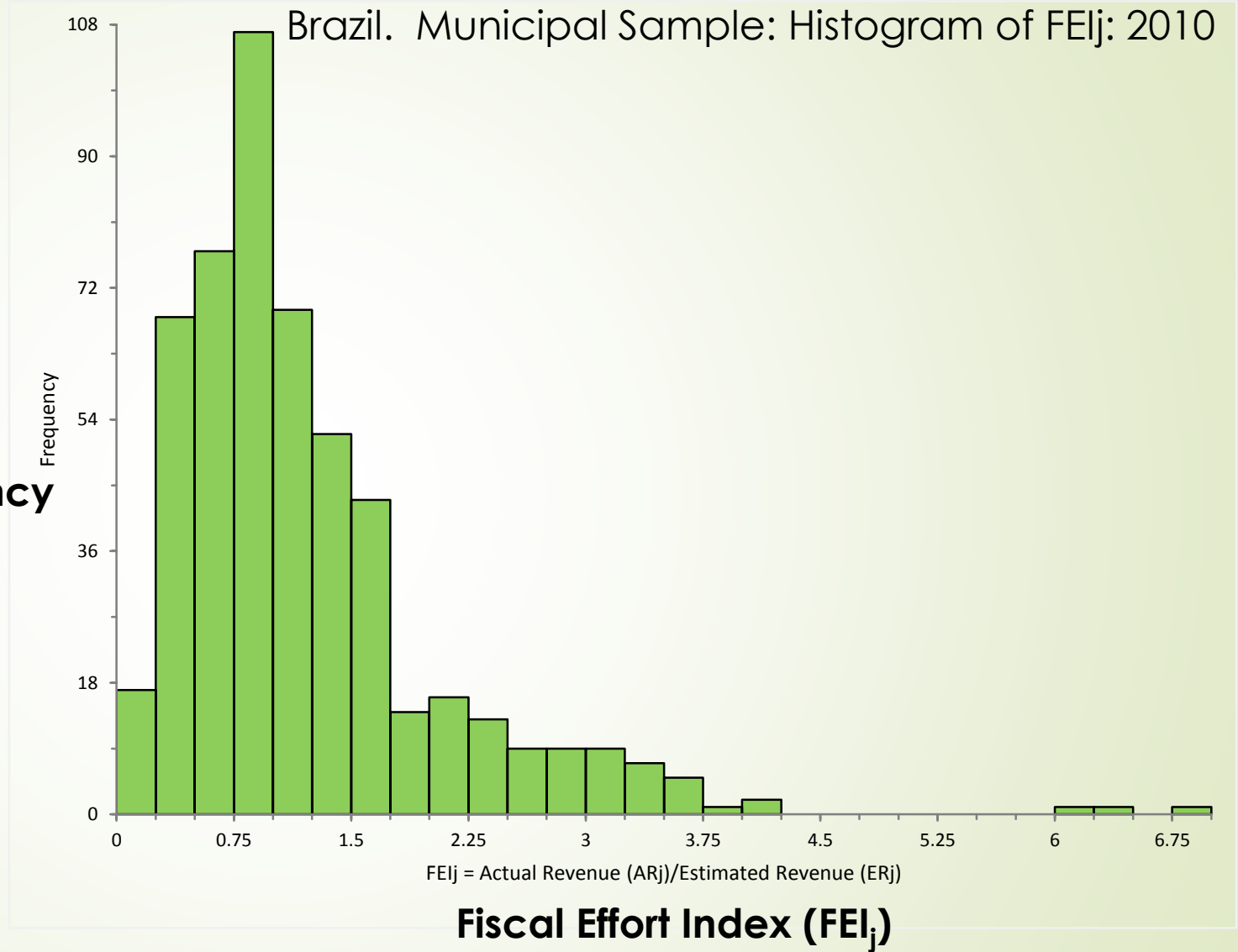
Fiscal Effort Index (FEI<sub>j</sub>) = Actual Revenue (AR<sub>j</sub>) / Estimated Revenue (ER<sub>j</sub>)



**Data analysis:  
Calculation and  
analysis of the Fiscal  
Effort Index: 2010**

**Fiscal Effort Index (FEI<sub>j</sub>) =**  
Actual Revenue/ Expected  
Revenue (AR<sub>j</sub>/ ER<sub>j</sub>)

**Chart 3**



**Data analysis: Calculation  
and analysis of the Fiscal  
Effort Index**

**Brazil. Municipal Sample: Fiscal  
Effort Index (FEI<sub>j</sub>): Quartiles: 2006  
and 2010**

<b>Quartiles</b>	<b>2006</b>	<b>2010</b>
<b>1st quartile</b>	<b>0.65</b>	<b>0.68</b>
<b>Median</b>	<b>0.99</b>	<b>0.96</b>
<b>3rd quartile</b>	<b>1.55</b>	<b>1.48</b>

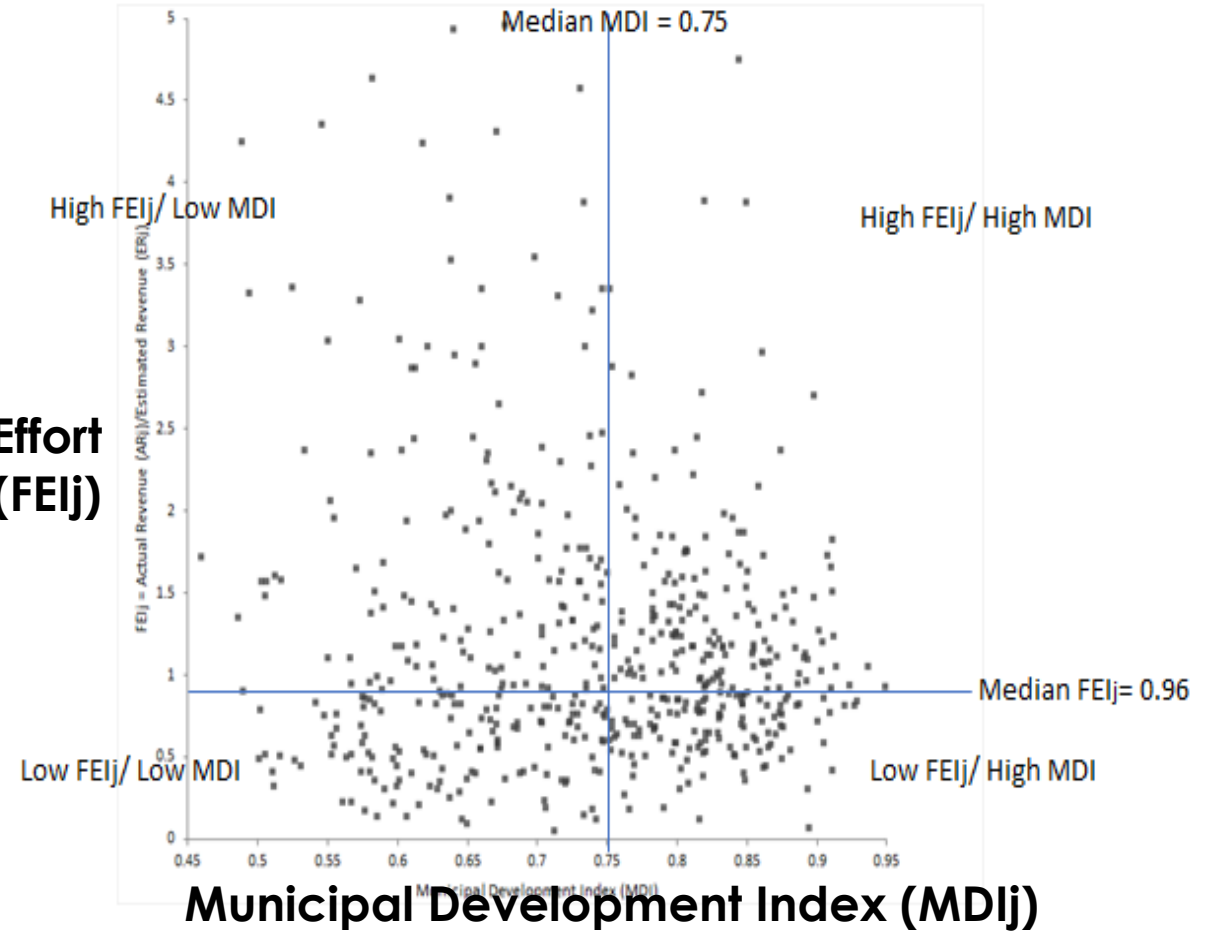
Data analysis:  
Calculation and  
analysis of the Fiscal  
Effort Index

Fiscal performance as  
shown FEI<sub>j</sub> is **not** correlated  
with the socioeconomic  
development index (MDI)

Chart 4

Brazil: Municipal sample: Scatter plot of FEI<sub>j</sub>  
and MDI<sub>j</sub>: 2010

Fiscal Effort  
Index (FEI<sub>j</sub>)



**Data analysis:**  
**The adequacy  
of the Fiscal  
Effort Index**


- ▶ Does the Fiscal Effort Index meet the criteria?
  - Grounded in research:
    - Covers the key variables influencing municipal fiscal capacity
    - Would allow for inclusion of additional independent variables
  - Sensitive to the underlying phenomenon and statistically sound:
    - The independent variables in the model are statistically significant
    - Are sensitive to changes in the underlying phenomenon



**Data analysis:**  
**The adequacy**  
**of the Fiscal**  
**Effort Index**

➔ Does the Fiscal Effort Index meet the criteria? (*continuation*)


- Intelligible and easily interpreted:
  - Comparison of actual with expected revenue is quite straightforward
  - It is clear what the indicator is measuring
- Timely: Could be calculated annually
- Consistent over time:
  - Test to see if the coefficients are consistent over time



## Data analysis: The adequacy of the Fiscal Effort Index

- ▶ Furthermore, the Index:
  - Allows for analysis of subgroups based on:
    - Policy relevance (*e.g., potential for project participation*)
    - Socioeconomic level or place in the urban hierarchy (*e.g., metropolitan areas, regional capitals, etc.*)
  - Could be used in conjunction with other indicators useful for policy makers and potential lenders,
    - such as indicators of creditworthiness, investment levels, etc.

**National and state  
government strategies  
for boosting  
municipal fiscal effort**



- ▶ Brief review of some projects seeking to raise municipal fiscal effort by providing:
  - Technical assistance
  - Financial incentives
- ▶ Existing projects that have already boosted municipal fiscal effort

## Boosting municipal fiscal effort: Technical assistance

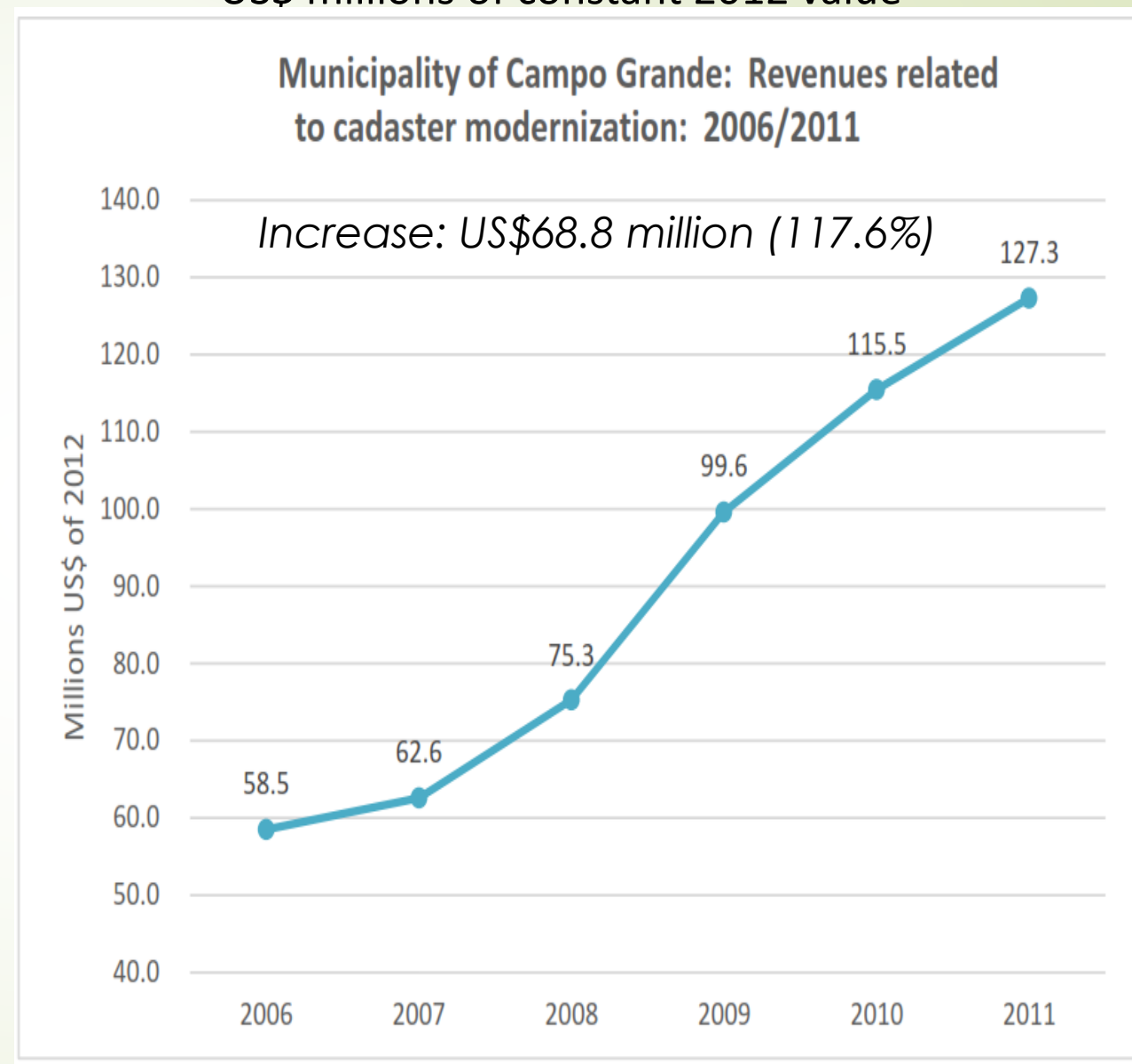
### The fiscal impact of cadaster modernization in Campo Grande (MS)


Revenue from real estate property and transfer taxes and betterment levies

IDB Project: *Programa Nacional de Apoio à Modernização Administrativa e Fiscal de Municípios Brasileiros/ PNAFM*

### Chart 5

US\$ millions of constant 2012 value





**Boosting municipal  
fiscal effort:  
Financial  
incentives**

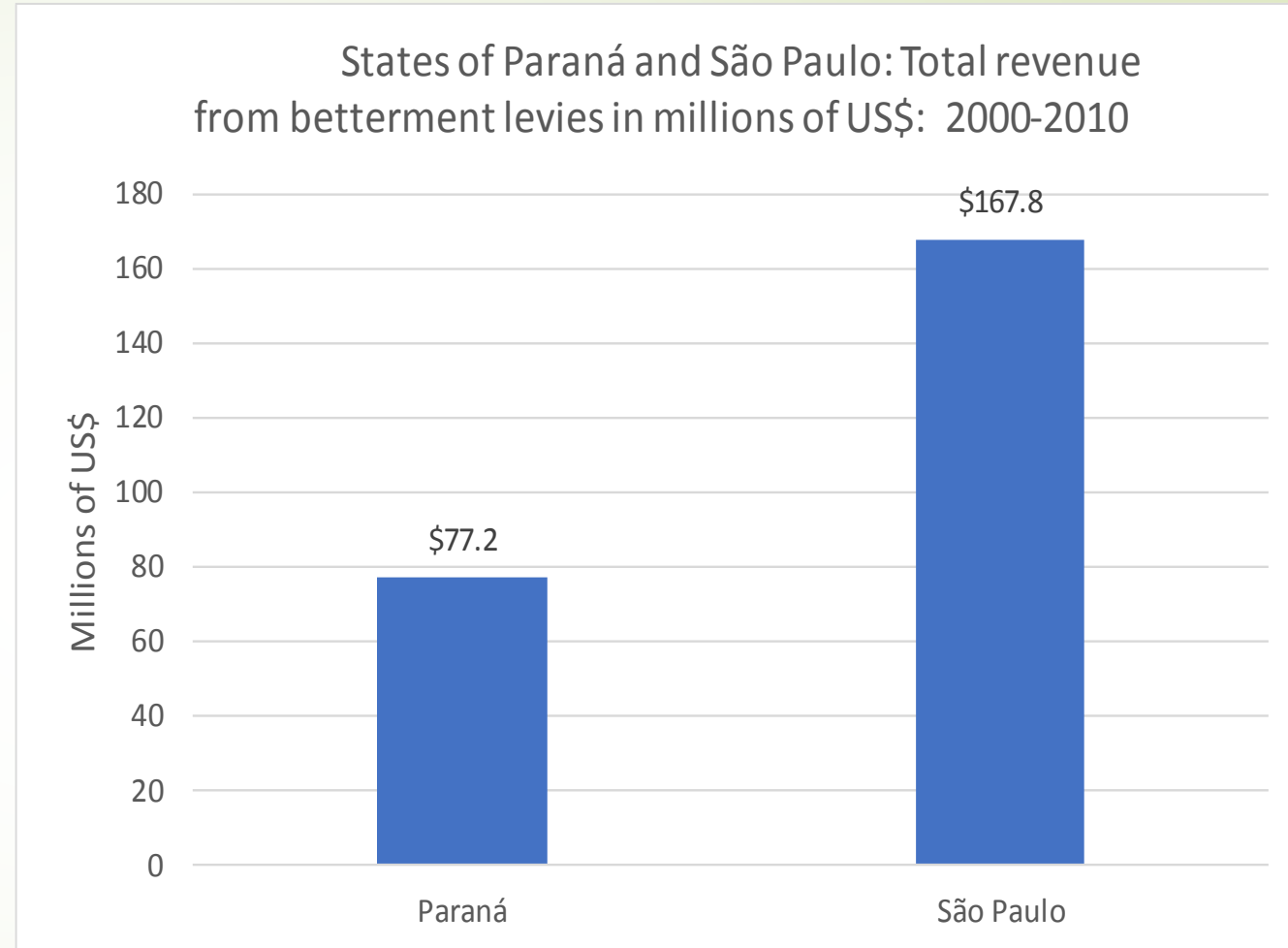
- ▶ What might be a broader national or state government strategy for providing financial incentives for greater municipal fiscal effort?
- ▶ IDB's municipal development projects in Brazil's State of Parana have effectively provided incentives for increased municipal fiscal effort
  - Parana I, II and III


## Boosting municipal fiscal effort: Financial incentives

### ➔ The Parana municipal development projects

- Have made a concerted effort to encourage betterment levies (Pereira et al. 2012)
- Parana ranked second only to São Paulo among the Brazilian states in collection of betterment levies for 2000-2010

Chart 6





**Boosting municipal  
fiscal effort:  
Financial  
incentives**

- ▶ One option: A new generation of national or state municipal development projects could offer:
  - Technical assistance and
  - Financial incentives for greater fiscal effort



## Future Studies

- ▶ The results suggest several future studies:





## Future Studies

- ▶ Why do some municipalities exert exceptionally high fiscal effort?
  - For example, analyze the outliers of the fiscal effort models
  
- ▶ How successful have projects been in encouraging municipal fiscal performance?
  - For example the impact of:
    - Cadaster and revenue administration projects
    - Projects that provide financial incentives (e.g., the projects in Paraná and Ecuador)

## **Future Studies**

- What classifications of municipalities would be most relevant for policy analysis?
  - How to organize municipalities into more homogeneous groups?



## Final note

- To develop an effective strategy for closing the financing gap at the municipal level
  - Public sector policy makers and private sector financial analysts need a concise set of indicators covering all key areas, such as:
    - Fiscal capacity and effort
    - Expenditure efficiency
    - Creditworthiness (e.g., operating balance, debt service and debt)
- **Important and urgent**, given the importance of municipalities in Brazil's public sector

**THANK YOU!**