



# A Time to Build: Does Technical Assistance Matter for Revenue Mobilization?

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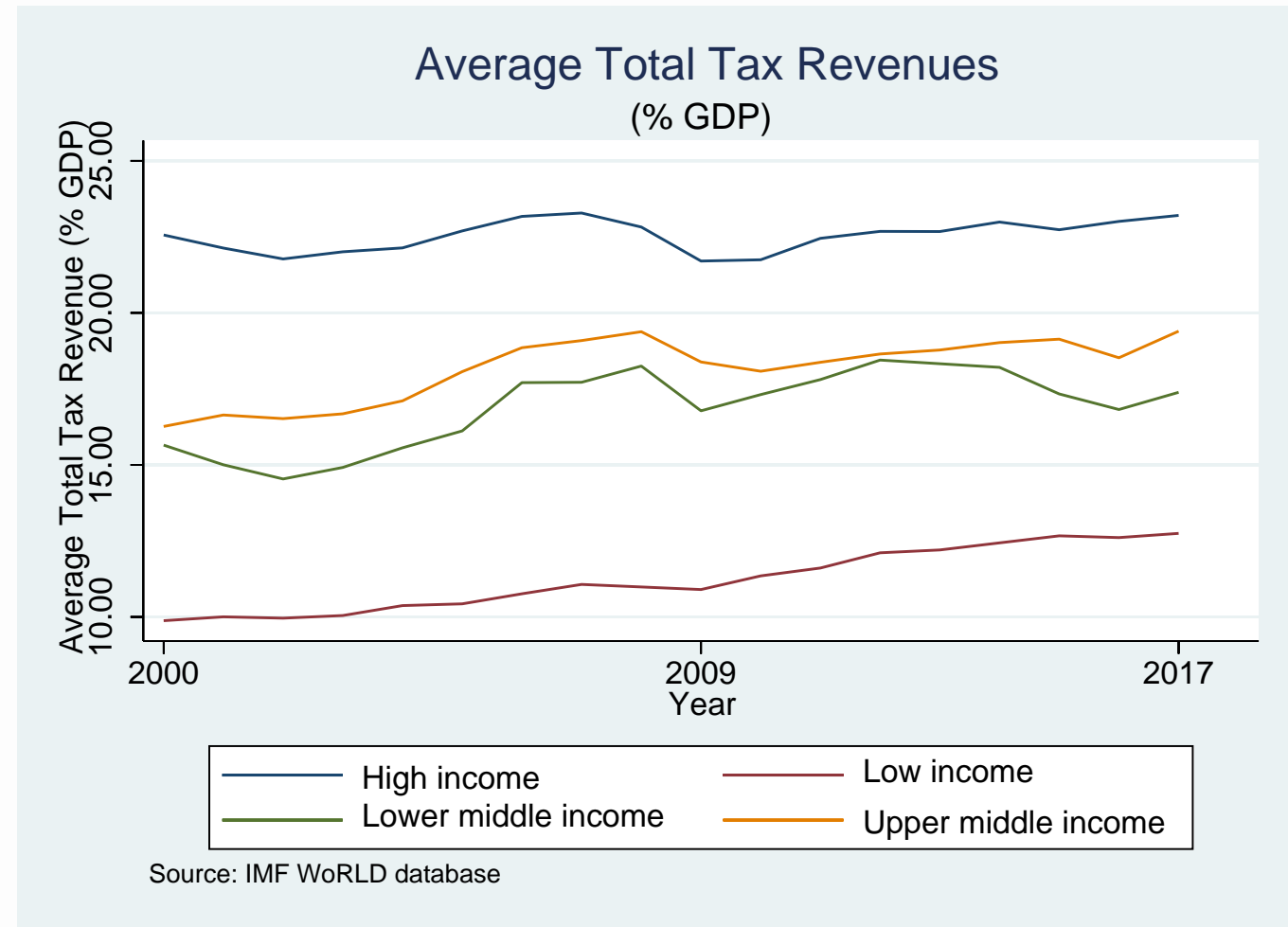
# Agenda

- Background and Motivation
- Strategy of Research
- Overview of Empirical Strategy and Variables
- Estimation Results
- Concluding Remarks

# Background and Motivation

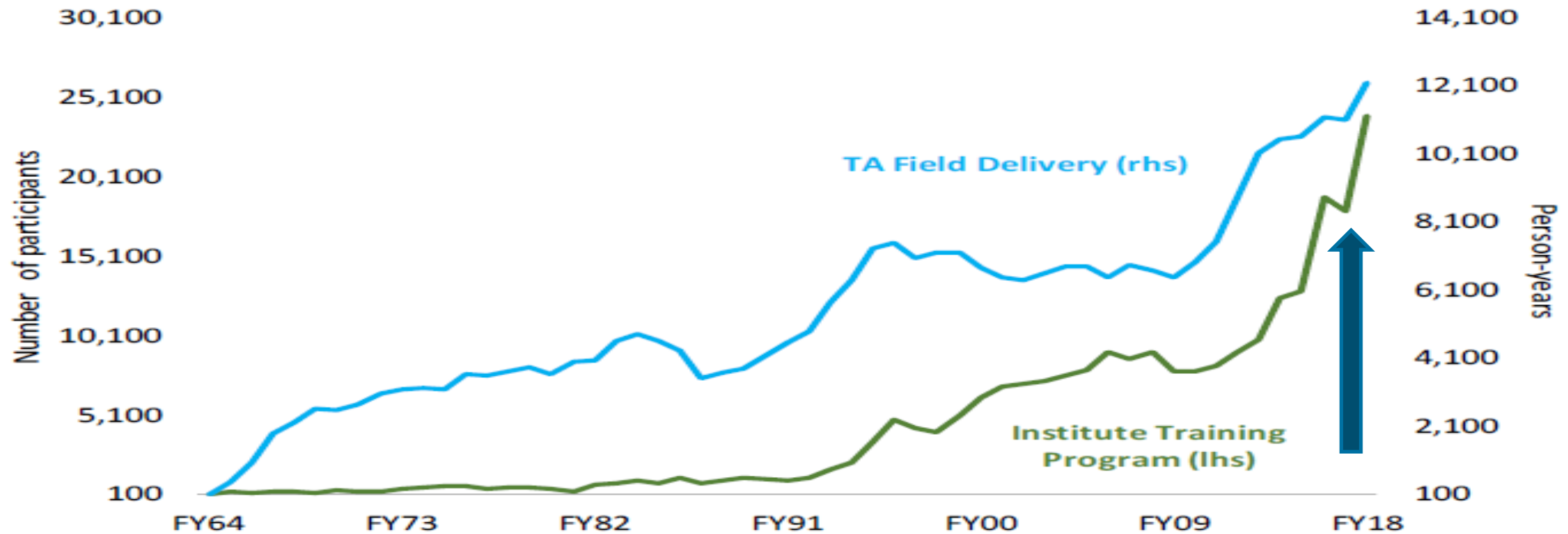
## Three critical issues faced by Economies:

- **Financing for Development**
- **Strong Institutions**
- **Building resilience to shocks**



# Background & motivation – Development of Fund TA and training(CD)

**Figure 1. TA and Training Evolution**  
(Index 1964=100)



Sources: 2013 CD Strategy Paper; Participant and Applicant Tracking System; Travel Information Management System (TIMS); and Fund staff calculations.

Note: Based on number of training participants and TA delivery (not including HQ-based support due to limitations on historic data series).

# Background & Motivation – Study considerations

How do we measure the impact of CD?

Issues of Identification and endogeneity

Various country cases and assessments e.g. the impact of FUND CD in fragile states, particularly fiscal capacity (IMF 2017)

External evaluations contain evidence of effectiveness of IMF multi-donor TA (DevTech Systems 2015 & Consulting Base 2015)

Limited empirical work on the impact of CD on revenue mobilization

# Strategy of Research

# WHAT THE RESEARCH DOES

**Explores the impact of IMF's TA on tax revenues by analyzing a panel of 115 countries covering the years 2000 to 2018 by using:**

- ❖ Data from FAD TA in full-time equivalents (FTEs)
  - Excludes TA provided through Regional Capacity Development Centers and other Regional Blocs
- ❖ Comprised TA in Tax Policy and Revenue Administration

# DOES CD MATTER? – YES!

**IMF's TA**

significantly and  
positively improves

**Tax Revenues/GDP**

- ❖ After **five-year** averaging of the panel
- ❖ Dynamic estimations via CS-ARDL exhibits a Long-run relationship between TA and Tax Revenues/GDP
- ❖ Underscoring that institutions perform better on revenue mobilization when given **“time-to-build”**.



# Overview of Empirical Strategy and Variables

# Econometric Model (1)

Estimation technique 1: **Fixed Effects**

Equation:

$$y_{i,t} = \alpha_i + \lambda_t + \beta F_{i,t-1} + \theta X_{i,t} + \epsilon_{i,t}$$

**Dependent variable:**

Tax Revenues  
(% of GDP) in  
logs

**Independent variable of interest:**

IMF FAD TA lagged  
( $F_{i,t-1}$ ) in logs

**Control variables  $X_{i,t}$  :**

per capita GDP, debt/GDP,  
agriculture/GDP, trade  
openness, inflation, IMF  
programs and corruption

# Why estimate using fixed effects?

- ❖ There are **intrinsic differences between countries**, and this could influence how TA affects revenues
- ❖ Hausman test suggests Fixed Effects over Random Effects Model
- ❖ Additional tests showed that **time effects not significant**

# Econometric Model (2)

## Estimation technique 2: **CS-ARDL**

### Equation:

$$y_{it} = c_{it}^* + \sum_{l=1}^{pi} \theta_{il} y_{i,t-l} + \sum_{l=0}^{qi} \beta'_{il} x_{i,t-l} + \sum_{l=1}^{pi} a_{il} \bar{y}_{t-l} + \sum_{l=0}^{qi} b'_{il} \bar{x}_{t-l} + \varepsilon_{it}$$

$y_{it}$  is the tax ratio, for country  $i$  in year  $t$

$c_{it}^*$ , fixed effects

$x_{i,t}$  a vector of explanatory variables

$\bar{y}_t$  and  $\bar{x}_t$  represent the simple cross-section averages of  $y_{it}$  and  $x_{it}$  in year  $t$ .

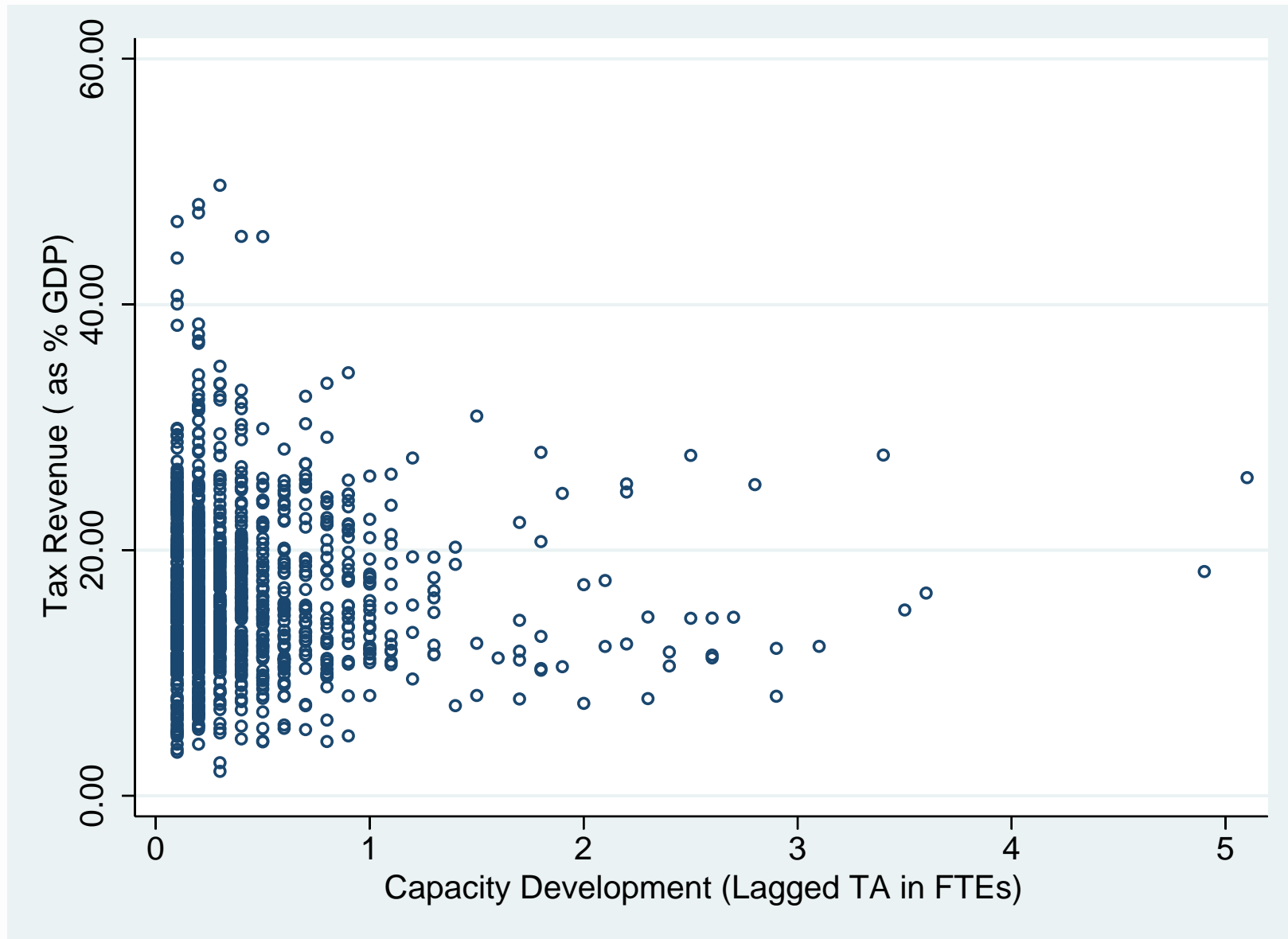
# Why estimate using CS-ARDL?

- ❖ CS-ARDL takes account of cross-country heterogeneity and cross-sectional dependence
- ❖ It also generates consistent estimates of the mean of short-run coefficients
- ❖ Cross-section averages capture a range of unobserved common factors, act as instruments in the regressions and obviate the need to include too many controls in estimations

# Variables and Data Sources

Variables	Source
Tax revenue, percent of GDP	IMF
FAD Technical Assistance	FAD
IMF Program dummy	IMF MONA Database
Agriculture Value-added, percent of GDP	WDI
Trade Openness, percent of GDP	IMF IFS
GDP per capita	WDI
Inflation, in percent	IMF IFS
Debt, percent of GDP	WEO
Control of Corruption, estimate	WGI
Conflict	UCDP/PRIO

# Tax/GDP vs CD (All Panel)



# Estimation Results



# Overview of Baseline Results

VARIABLES	(Log) Tax Revenues as a % of GDP
TA in FTEs (log & lagged)	0.0358** (0.016)
IMF Program Participation (Dummy)	0.0188 (0.0276)
(Log) Trade Openness (% GDP)	0.182** (0.0836)
(Log) Agric value added (% of GDP)	-0.0164 (0.101)
Inflation, consumer prices (annual %)	-0.00249 (0.00306)
Log GDP per capita	0.354*** (0.112)

VARIABLES (Cont'd)	(Log) Tax Revenues as a % of GDP
Debt as a % of GDP (log & lagged)	-0.0138 (0.0285)
Control of Corruption, Estimate	0.147** (0.0582)
Constant	-0.648 (1.148)
<b>Observations</b>	<b>190</b>
<b>Number of countries</b>	<b>115</b>
<b>R-squared</b>	<b>0.357</b>
Robust standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

# Robustness Checks

# Estimation without Resource-Rich Countries

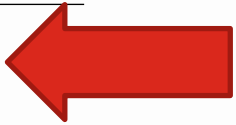
Address the question  
about resource rich  
influencing the outcome

1% increase in TA leads to  
~ 0.06% increase in tax  
revenue

VARIABLES	(Log) Tax Revenues as a % of GDP
TA in FTEs (log & lagged)	0.0555*** (0.0162)
Trade Openness (log)	0.176*** (0.065)
GDP per capita (log)	0.464*** (0.105)
Control of corruption	0.155** (0.0639)
Observations	126
Number of countries	77
R-squared	0.544

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Estimation for Low Income Countries (LICs)

Technical assistance contributes positively to the improvement in tax revenues for LICs

1% increase in TA leads to ~ 0.07% increase in tax revenue- albeit subject to a small sample size

VARIABLES	(Log) Tax Revenues as a % of GDP
TA in FTEs (log & lagged)	0.07* (0.04)
GDP per capita (log)	1.36*** (0.373)
Observations	34
Number of countries	13
R-squared	0.71

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



# Fixed Effects IV

## Instruments:

Membership of a regional technical assistance center, participation in an IMF program and lagged dependent variables

1% increase in TA leads to ~ 0.03% increase in tax revenue

VARIABLES	(Log) Tax Revenues as a % of GDP
TA in FTEs (log & lagged)	0.0349** (0.0162)
Trade Openness (log)	0.189* (0.065)
GDP per capita (log)	0.340*** (0.122)
Control of corruption	0.142** (0.0571)
Observations	180
Number of countries	111
R-squared	0.325

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Confirms the existence of a long-run (LR) relationship between income per capita, technical assistance and the tax ratio

# CS-ARDL

	Full sample	Excl. Resource Rich	LICS
Variables	Long Run Coefficients		
Error Correction Term	-0.702*** (0.036)	-0.710*** (0.0379)	-0.656*** (0.101)
TA	0.0383*** (0.009)	0.0179* (0.01)	0.123*** (0.019)
Openness	0.086*** (0.019)	0.052** (0.022)	0.283*** (0.033)
GDP per capita	0.145*** (0.036)	0.201*** (0.039)	-0.353*** (0.118)
Constant	-0.541 (0.561)	0.318 (0.541)	-3.279** (1.302)
Observations	1,887	1,360	323
No. of Countries	111	80	19

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Concluding Remarks

# Conclusion



## Results:

Paper provides evidence that the provision of CD leads to a positive impact on tax revenues-to-GDP. This is a lower bound as it excludes TA provided through Regional Capacity Development Centers or other CD providers.

## Further Findings:

- Positive impact of IMF's TA on tax revenues after five-year averaging of the panel —underscoring that institutions perform better on revenue mobilization when given “time-to-build”.
- Results are robust to the exclusion of resource rich countries.
- Technical assistance also has the largest long-run impact on tax revenues in LICs

## Further Research:

Always scope for other explanations for what we observe.







# Thank You

