Fiscal Federalism and Regional Disparities: Evidence from Mexico

Sonia Araujo (OECD)
David Bartolini (OECD)
Agustin Redonda (CEP)

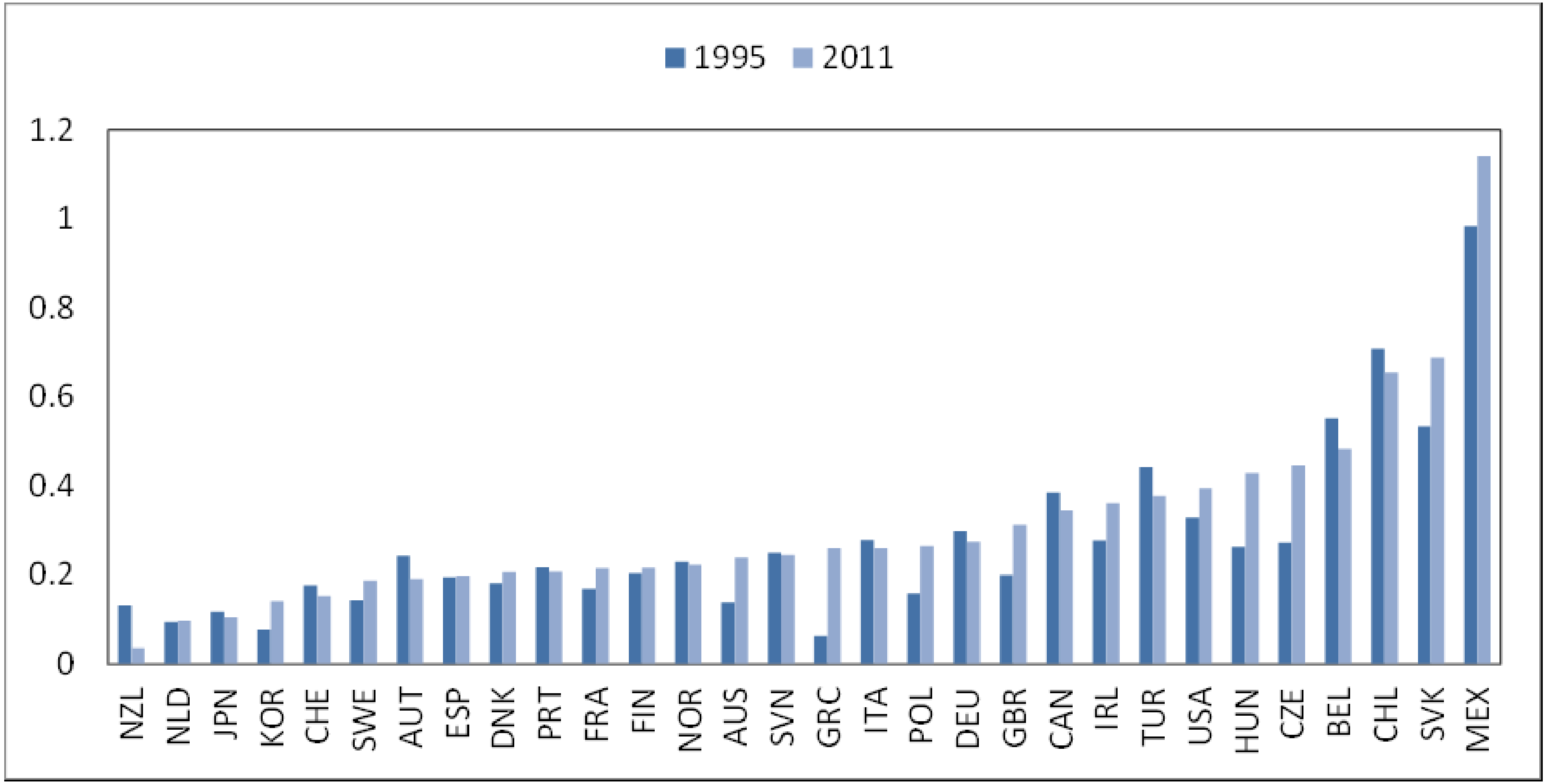
Motivation

- Large regional differences across Mexico
  - GDP pc in Chiapas is just 30% of the GDP pc in Mexico city
  - Difference in GDP per capita account for different standards of living and opportunities across Mexico
  - Mexico is a federal country – should the autonomy of the State governments be increased or reduced?

- Two main questions:
  1. Does Fiscal Decentralization (FD) improve the performance of State economies?
  2. Does FD promote convergence across Mexican states?

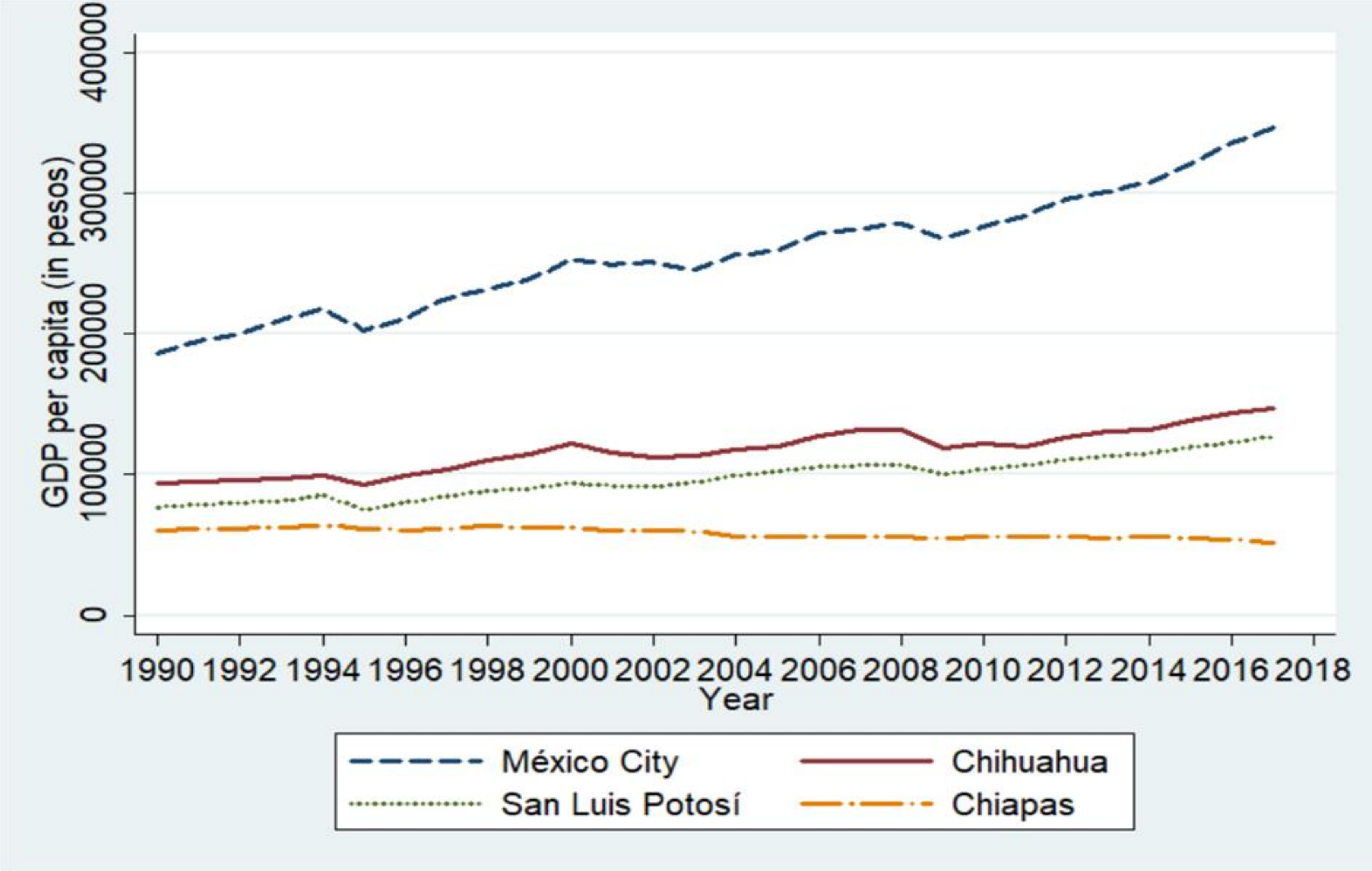
Differences across Mexican States are large

Variation of GDP per capita across subnational jurisdictions in OECD countries



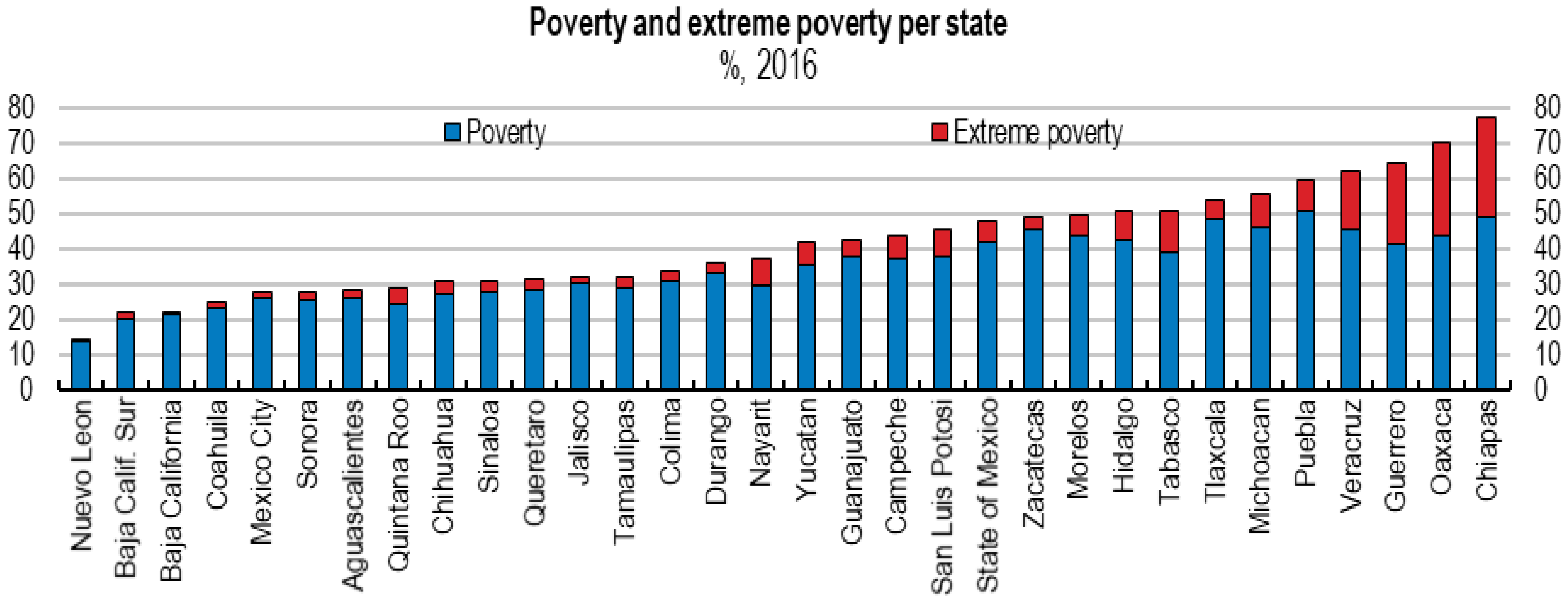
Source: Bartolini et al (2016)

The Gap is widening



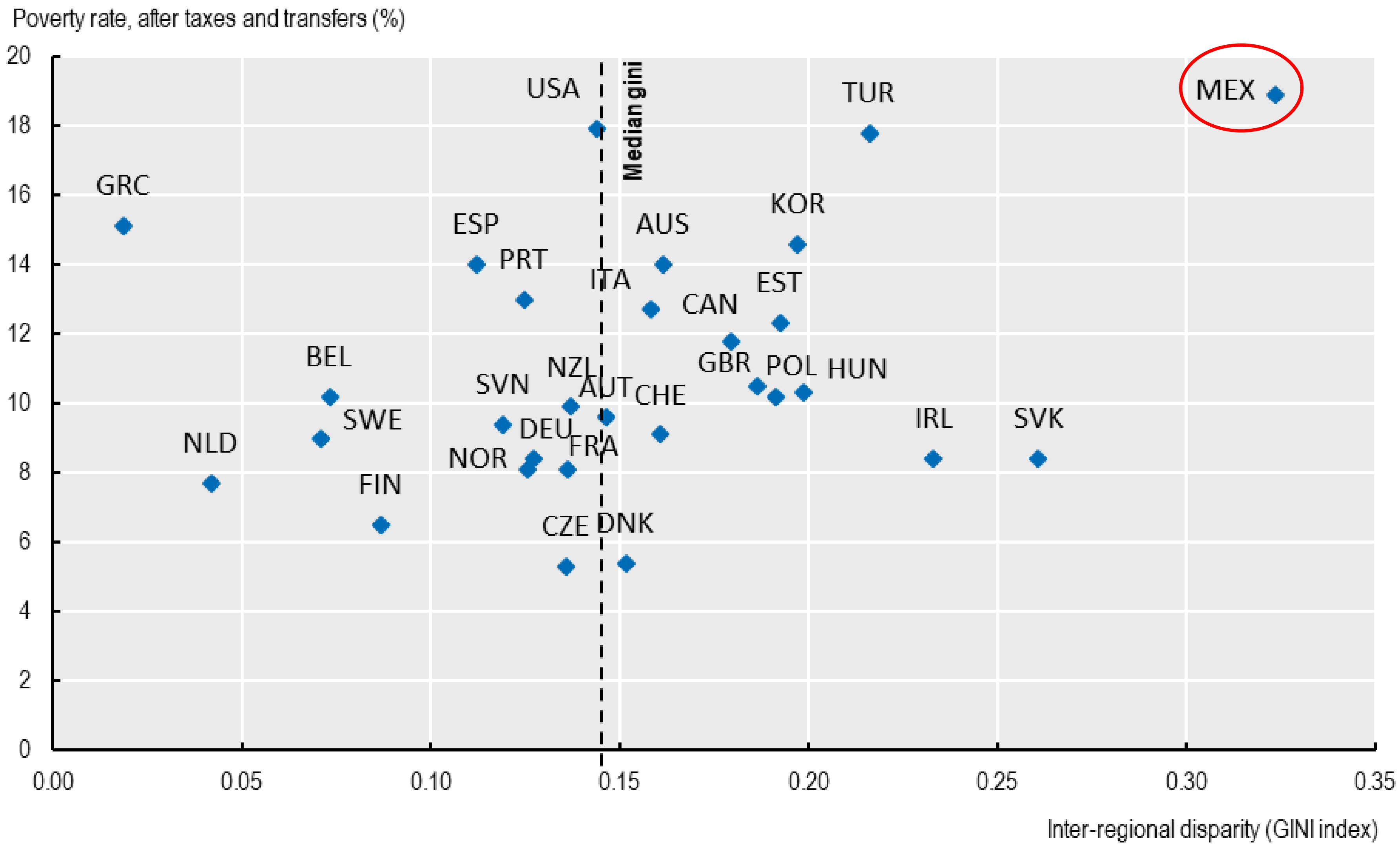
Source: Authors' calculations.

Large disparities also in living conditions



Source: OECD (2019): Economic Survey of Mexico 2019.

Inter-regional disparities are large



Source: OECD (2016): Regions at a Glance.

The role of fiscal decentralization in promoting regional growth and convergence

- More FD (in particular **tax decentralization**):
  - Better match with citizens' preferences (Oates, 1999)
  - Higher incentive to expand the tax base – i.e., pro-growth policies (Lessmann, 2009; Bartolini et al, 2016)
- But lack of capacity for poor jurisdictions call for **transfers:**
  - The public administration in poorest jurisdictions may lack the capacity to implement efficient (and effective) local policies (Prud'homme, 1995; Kyriacou et al, 2013)
- However, **transfers**:
  - Do not provide any incentive to revitalise the local economy
  - Rent-seeking by politicians (Brennan-Buchanan, 1983)

Policy trade-off: incentives *vs* transfers

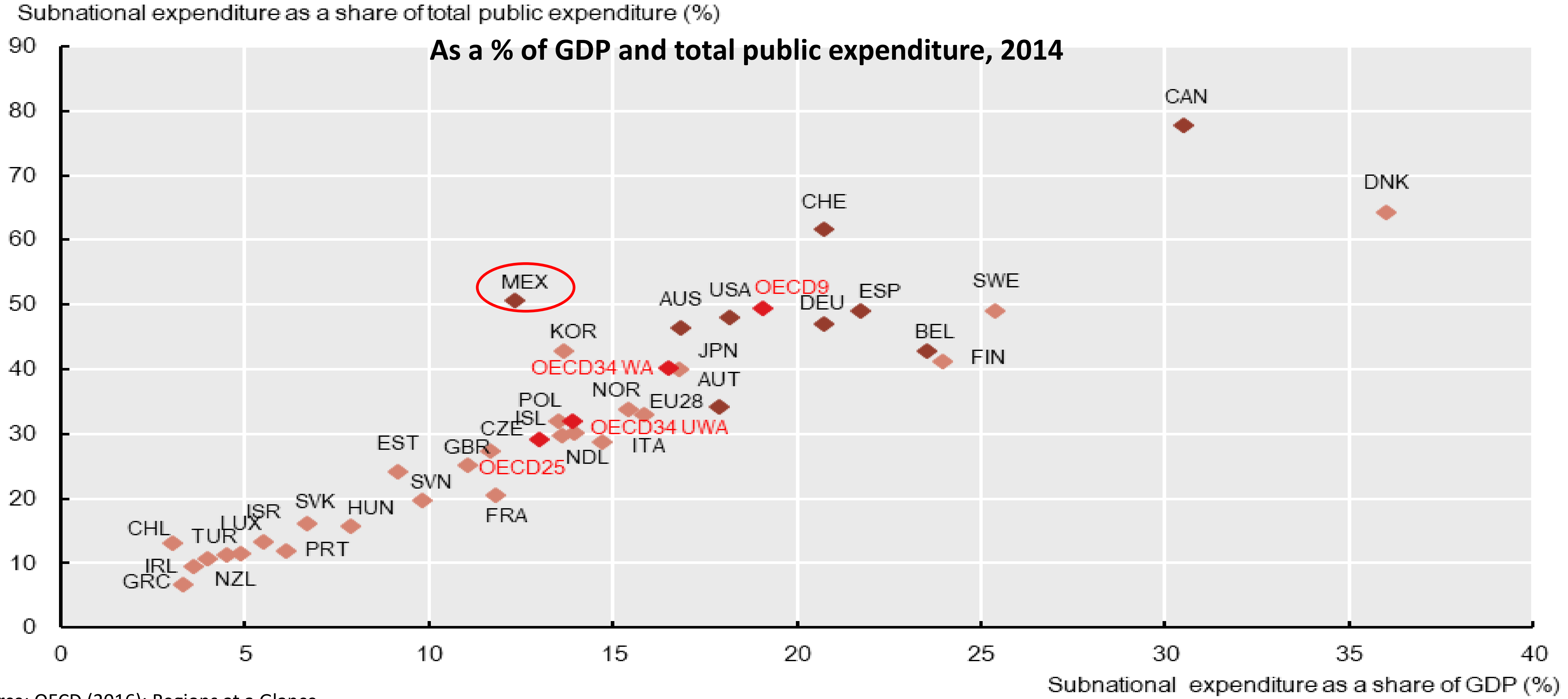
Fiscal responsibility, promotes growth	Lack of capacity, hinders growth
• Incentive to expand the tax base → promoting economic growth • Pro-growth policies to attract people and companies	• Poor states may have no capacity to compete or ignite local economic development • Poor institutions (low efficiency, high corruption) may reduce the government ability to promote growth

Key issues of federal fiscal relations in Mexico

- Progressive decentralization of public services (spending responsibilities) in key areas for growth and well-being since the 1990s: education, health, infrastructure, poverty alleviation
  - Subnational governments now spend more than the federal government
  - Impact of public spending on growth, convergence and equity depends on subgovernmental spending

- Centralization of revenues
- Vertical fiscal gap: Large asymmetry between (State-level) revenue generation and (State-level) responsibilities
  - Achieve fiscal equalization
  - States rely on intergovernmental transfers
  - Affects (State-level) revenue collection incentives
  - Impacts on the quality of subnational spending (accountability, transparency)

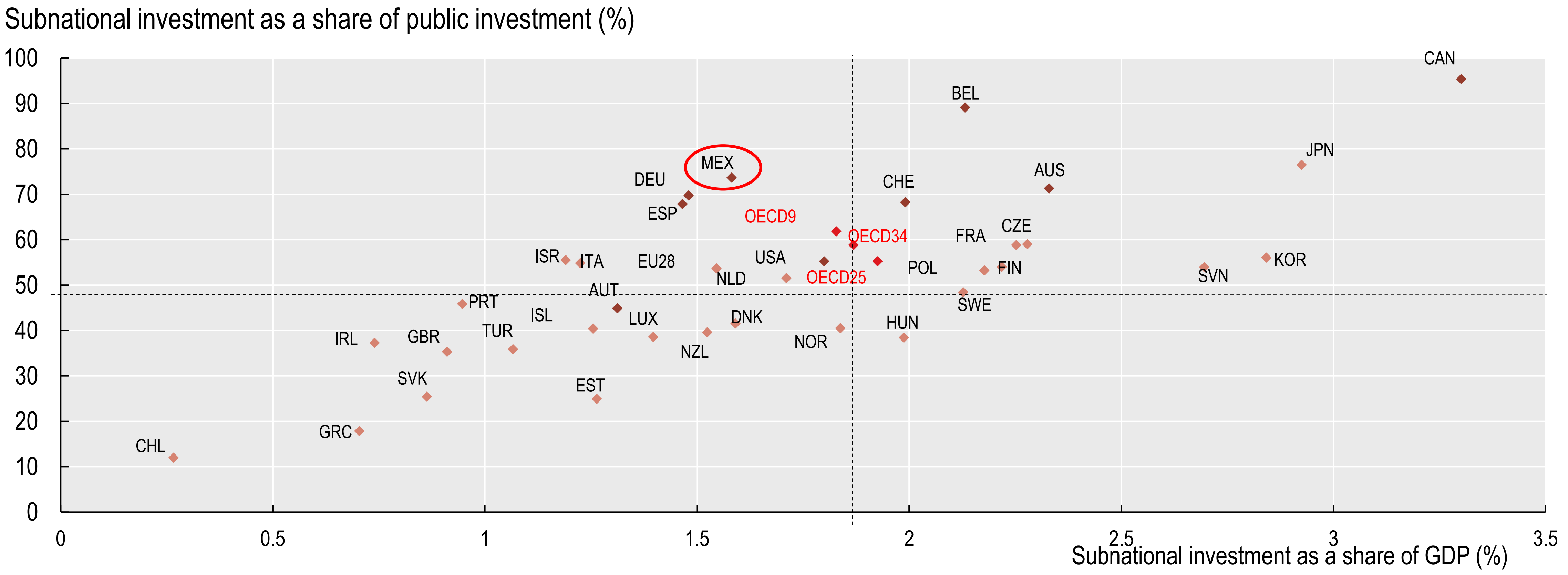
Subnational government expenditure



Source: OECD (2016): Regions at a Glance.

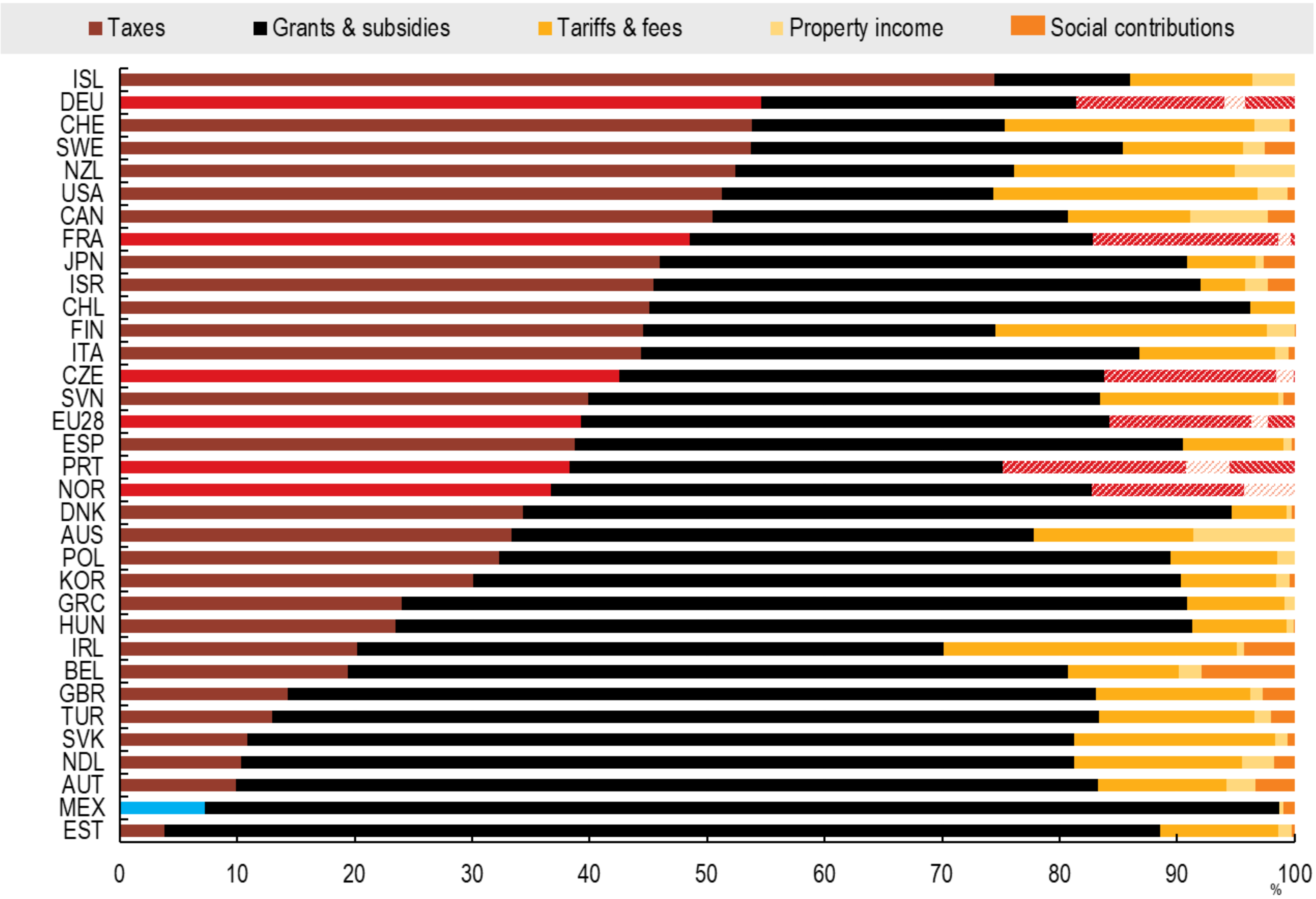
Subnational governments in Mexico are responsible for a large share of public investment

As a % of GDP and total public investment, 2014



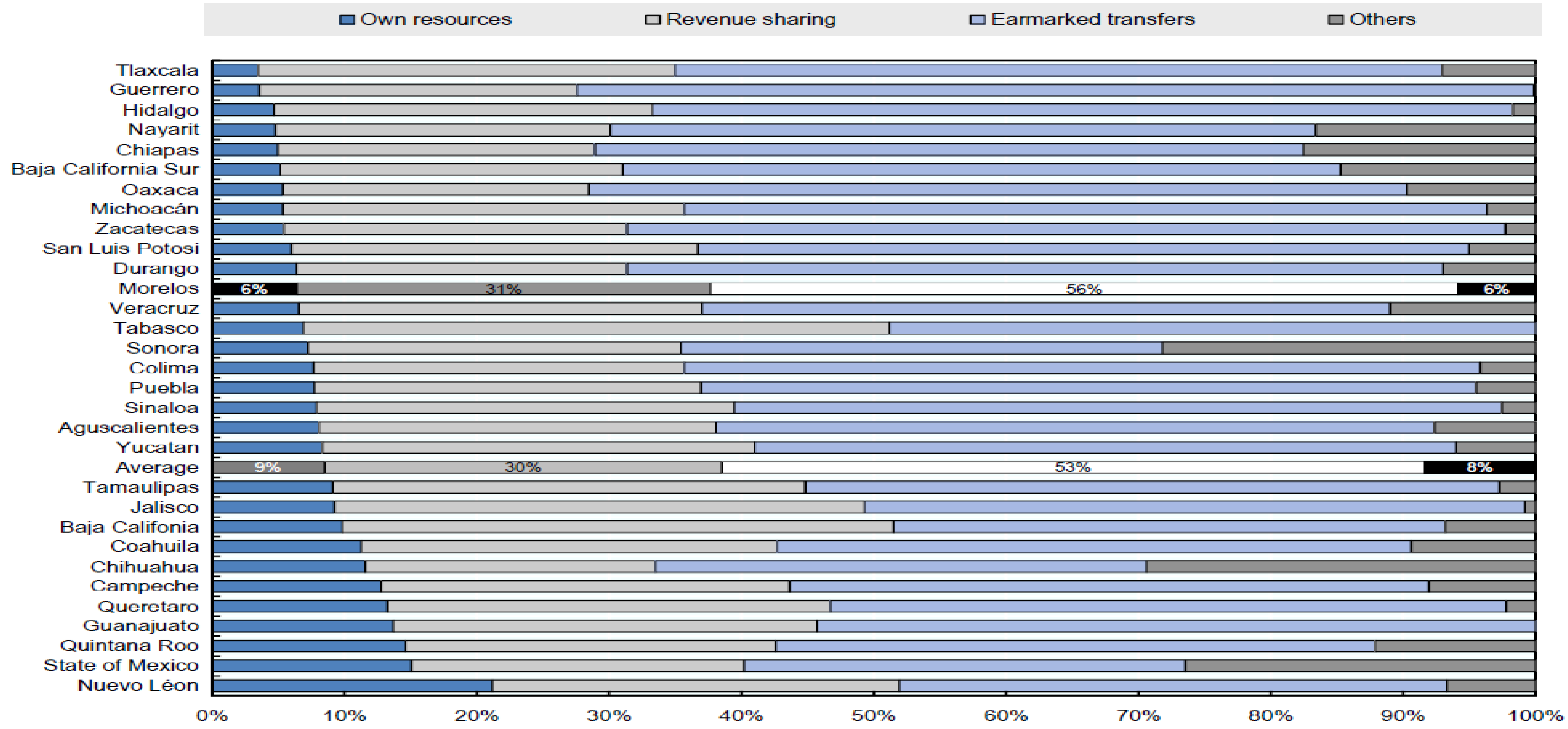
Source: OECD (2016): Regions at a Glance.

Subnational governments depend largely on transfers



Source: OECD (2016): Regions at a Glance.

There is significant variation on own resources across Mexican States



Source: INEGI.

Empirical Strategy

1. Balanced panel of **31 Mexican States** plus **Mexico City**
2. Over the period **1990-2017**
3. **Fixed effect estimator** to assess impact of FD on GDP pc
4. **Instrumental variable** approach to test robustness and issues of reverse causality
5. **Convergence** → look at the impact of FD on the GDP per capita **gap** with respect to the frontier state (CDMX)
6. Work in progress: Investigate one possible channel → **capital spending** at the state level driven by FD

Fixed Effects model

- $Y_{i,t} \Rightarrow$ GDP per capita in State *i* at time *t*

$$Y_{it} = \beta_0 + \beta_1 FD_{it} + \beta \boldsymbol{X}_{it} + \delta_i + \gamma_t + \varepsilon_{it} \qquad (1)$$

- *FD* (Fiscal Decentralization indicators):
  - Revenue per capita (expect a positive sign)
  - Tax revenue to GDP (expect a positive sign)
  - Dependency ratio (expect a negative sign)
- **X** Controls
  - Characteristics of the state economy: employment rate, share of informal workers, share of high educated workers, etc.
- State δ_i and year γ_t fixed effect

Baseline: FE results

FD variable	Tot rev pc	Tax-to-GDP	Depend ratio
Total revenue per capita	0.0903*** [0.0253]		
Population	-0.679*** [0.116]	-0.711*** [0.113]	-0.741*** [0.117]
Employment	0.263*** [0.0892]	0.258*** [0.0887]	0.275*** [0.0890]
Informal	-0.00680*** [0.00139]	-0.00709*** [0.00143]	-0.00695*** [0.00147]
High education	0.00314* [0.00179]	0.00391** [0.00186]	0.00345* [0.00183]
Oil	0.613*** [0.165]	0.687*** [0.163]	0.696*** [0.170]
Tax-to-GDP ratio		0.0342 [0.0219]	
Dependency ratio			-0.000856** [0.000351]
Observations	403	403	403

Baseline: IV results

FD variable variable	Tot Rev pc	Tax-to-GDP	Depend ratio
Total revenue per capita	0.0337		
	[0.0491]		
Population	-0.494***	-0.448**	-0.371**
	[0.173]	[0.175]	[0.180]
Employment	0.501***	0.440**	0.339*
	[0.174]	[0.178]	[0.185]
Informal	-0.0193***	-0.0194***	-0.0179***
	[0.00122]	[0.00115]	[0.00118]
High education	0.0116***	0.0109***	0.0104***
	[0.00212]	[0.00190]	[0.00182]
Oil	0.175***	0.186***	0.187***
	[0.0253]	[0.0257]	[0.0254]
Tax-to-GDP ratio		0.0937	
		[0.0608]	
Dependency ratio			-0.00648**
			[0.00270]
Sargan test	0.660	0.308	0.036
	0.4167	0.5787	0.8490
Weak identif. Test	1315.211	1606.116	122.650
Observations	403	403	403

Lower fiscal dependency raises output per capita

- **State revenues** are associated with higher GDP per capita
  - Yet, not robust to IV - its significance disappears in the IV estimation, hinting of an endogeneity problem
- Less dependency on **federal government raises economic growth**
  - Robust to IV
  - 10 pp reduction in dependency ratio → boosts GDPpc by 0.86% (6.48% in the IV estimation)
- **On average**, higher responsibility to finance spending provides a valid incentive to promote economic growth in Mexican States

Convergence to the Frontier: Empirical model

- $Y_{i,t}$ ⇒ Gap in GDP per capita of State *i* at time *t* wrt to the frontier State (CDMX)

$$Y_{it} = \beta_0 + \beta_1 FD_{it} + \beta_2 (FD_{it} * R_{it}) + \boldsymbol{\beta X}_{it} + \delta_i + \gamma_t + \varepsilon_{it} \qquad (2)$$

- Interaction term: dummy "Rich"= 1 of if State's *i* GDP is above the median value in year *t*

Convergence: is FD reducing inequality across Mexican states?

	(1)	(2)	(3)	(4)	(5)	(6)
	Gap to the frontier					
Total revenue per capita	-4.916***			-6.256***		
	(1.272)			(1.290)		
tax revenue over GDP		-1.215			-3.485***	
		(1.153)			(1.332)	
Dependency ratio			0.004			-0.010
			(0.020)			(0.034)
Rich states				-32.114***	-2.780***	-3.263
				(7.517)	(0.984)	(3.644)
interaction w/tot rev				3.249***		
				(0.787)		
interaction w/tax					3.567***	
					(1.184)	
interaction w/dep						0.021
						(0.040)
population	36.836***	39.021***	39.886***	32.821***	35.540***	38.841***
	(5.423)	(5.527)	(5.479)	(5.384)	(5.549)	(5.515)
employment	-8.075**	-8.098*	-8.639**	-8.442**	-7.041*	-8.199**
	(4.071)	(4.178)	(4.153)	(3.983)	(4.132)	(4.161)
informality	0.214***	0.231***	0.232***	0.256***	0.264***	0.220***
	(0.067)	(0.068)	(0.068)	(0.067)	(0.070)	(0.069)
high education	-0.137*	-0.173**	-0.159**	-0.109	-0.151*	-0.170**
	(0.079)	(0.081)	(0.080)	(0.077)	(0.081)	(0.080)
Oil sector	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
N	403	403	403	403	403	403

Convergence to the Frontier:

- Increasing **Total Revenue** reduces the gap →
  - 1 pp increase in total revenue reduces the gap by 5%

- However, **relying more on taxation is important the poorer is the State**
  - The interaction term is positive if state is rich
  - The convergence effect of *Total Revenue and Tax-to-GDP* decreases as states become richer
- The dependency ratio has the right sign but it is not significant

Next steps: Potential Driving channels. Capital Spending and Rent Seeking

I. Impact of FD on State-level capital spending

- Our 3 FD variables have the expected impact on *Capital Spending* (positive for *Total Revenue* and *Tax-to-GDP* and negative for *Dep_Ratio* (Columns 1, 2 and 3)
- *Capital Spending* has a positive effect on *GDP pc* (Column 4)

  With declining marginal return of capital, this channel should promote convergence

II. Explore the role of local institutions

$$Y_{it} = \beta_0 + \beta_1 FD_{it} + \boldsymbol{\beta_2 Rev\_Free_{it} * Criminal_{it}} + \beta X_{it} + \delta_i + \gamma_t + \varepsilon_{it}$$

Capital Spending and Rent Seeking (preliminary)

Dependent variable FD variable Term interacted with FD	Capital Tot rev pc –	Capital Tax-to-GDP –	Capital Depend ratio –	GDP pc Capital spend –	GDP pc Free revenue Criminal
Total revenue per capita	12.51*** [3.897]				
Population	2.890 [10.89]	-1.405 [10.07]	-5.610 [10.20]	-0.729*** [0.114]	-0.713*** [0.111]
Employment	1.980 [7.962]	1.232 [8.219]	3.576 [8.026]	0.269*** [0.0899]	0.320*** [0.0856]
Informal	0.342*** [0.119]	0.302** [0.121]	0.320*** [0.122]	-0.00751*** [0.00147]	-0.00615*** [0.00143]
High education	0.156 [0.139]	0.264* [0.138]	0.199 [0.141]	0.00331* [0.00184]	0.00368** [0.00175]
Oil	-21.49 [15.13]	-11.28 [13.61]	-9.878 [14.91]	0.710*** [0.165]	0.556*** [0.177]
Tax-to-GDP ratio		4.929** [1.983]			
Dependency ratio			-0.115* [0.0678]		
Capital spending				0.00119** [0.000559]	
Free revenue					-0.00510*** [0.00132]
Criminal					-0.00883*** [0.00281]
Free revenue*Criminal					0.000285*** [0.0000789]
Observations	403	403	403	403	403

Concluding Remarks

- Differences in *GDP pc* and standards of living are large in Mexico
- Mexican States are not converging
- Mexican States are highly dependent on federal transfers but execute a high proportion of expenditures
- Increasing decentralization on the revenue side (i.e. reducing fiscal dependency) would promote pro-growth policies at the local level but not necessarily convergence
    - Some States may lack the required institutions to benefit from it

- **Next Steps:**
    - Investigate the role of transfers and other revenue sources in promoting convergence
    - Explore link between FD and capital spending
    - Explore the link between FD and rent seeking
- **What to do? Policy options**:
    - Promote fiscal responsibility and increase capacity at the State level
    - Introduce transparency, accountability rules
    - Reduce the vertical fiscal gap by incentivizing local tax collection

Thank you!

Sonia.Araujo@oecd.org
(corresponding author)

Appendix - Summary statistics

Variable	Units	N	Mean	Std. Dev.	Min	Max
GDP per capita	1,000	868	117.81	50.32	52.13	345.90
Gap to frontier	0-100	868	53.51	19.75	-16	85
Total revenue per capita	1,000	868	7.92	6.08	0.16	29.39
Tax-to-GDP ratio	%	868	0.22	0.25	0.01	1.77
Dependency ratio	%	868	81.59	14.91	19.58	97.72
Free revenue ratio	%	868	45.71	17.87	14.45	97.76
Capital spending ratio	%	868	8.99	6.59	0	57.25
Population	100,000	868	32.96	27.85	3.18	174.55
Employment	100,000	403	15.33	12.76	2.42	74.50
Informal	%	403	58.14	12.55	35.22	83.42
High education	%	403	52.53	8.99	27.44	71.02
Oil	Dummy	868	0.26	0.44	0	1