

# Subnational fiscal payments from large-scale mining and social spending

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# Outline

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- Context
- Data and methods
- Preliminary Results
- Policy Implications

# Goal of this paper

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- Do subnational fiscal payments from large-scale mining firms boost productive spending by municipal governments?
  - Production spending defined as spending on education, health and social services
  - Do mineral revenues impact how host communities allocate their budget on education, health and social services? i.e. spending priorities
  - Do local governments use mineral revenues as a substitute to other locally sourced taxes? (Crowding-out hypothesis)

# Context

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- Extractive industries generate substantial revenue for their host economies.
- However,
  - these revenues are volatile and finite,
  - and regions do not equally benefit from the windfalls from resource extraction
- Resource booms (e.g. opening of a mine, development of oil field) do not also guarantee improved welfare or development outcomes.
- In fact, many resource-rich countries struggle to translate natural wealth into assets that support sustainable development ('resource curse')

Development and real incomes vary significantly among resource-rich countries.

Country	Fiscal revenues from extractive industries		Exports (% of total goods exports)	GDP per capita, USD (PPP) (2011)	Human Development Index (HDI) ranking
	% of GDP	% of total revenues			
Azerbaijan	16.2	58.5	88.9	10,200	76 <sup>th</sup>
Bolivia	11.3	32.0	5.0	4,800	108 <sup>th</sup>
Botswana	17.1	44.0	77.5	16,000	118 <sup>th</sup>
Cameroon	6.0	27.0	47.0	2,300	150 <sup>th</sup>
Iraq	67.5	94.7	97.6	3,900	132 <sup>nd</sup>
Kazakhstan	7.2	27.5	54.4	13,000	68 <sup>th</sup>
Kyrgyz Republic	0.5	1.7	31.8	2,370	126 <sup>th</sup>
Norway	14.1	25.8	42.7	53,500	1 <sup>st</sup>
Russia	8.2	21.6	48.6	16,700	66 <sup>th</sup>
Saudi Arabia	34.0	72.5	88.8	24,200	56 <sup>th</sup>
Venezuela	18.7	58.0	93.0	12,600	73 <sup>rd</sup>

Source: IMF (2010); average 2006-10 figures

# Fiscal regimes in extractive sectors

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- Governments design fiscal arrangements (taxes, incentives, revenue allotment systems) that intend to:
  - Minimize detrimental effects of extractive activity, i.e. pollution, biodiversity loss
  - Channel rents to spending on broadly distributed human capital, e.g. higher spending on public goods and services
  - Ensure intergenerational equity ('fairness or justice' between generations)
- But fiscal regimes do not always imply higher allocation of public goods within host economies, especially at the local level.

# Literature: Subnational resource curse

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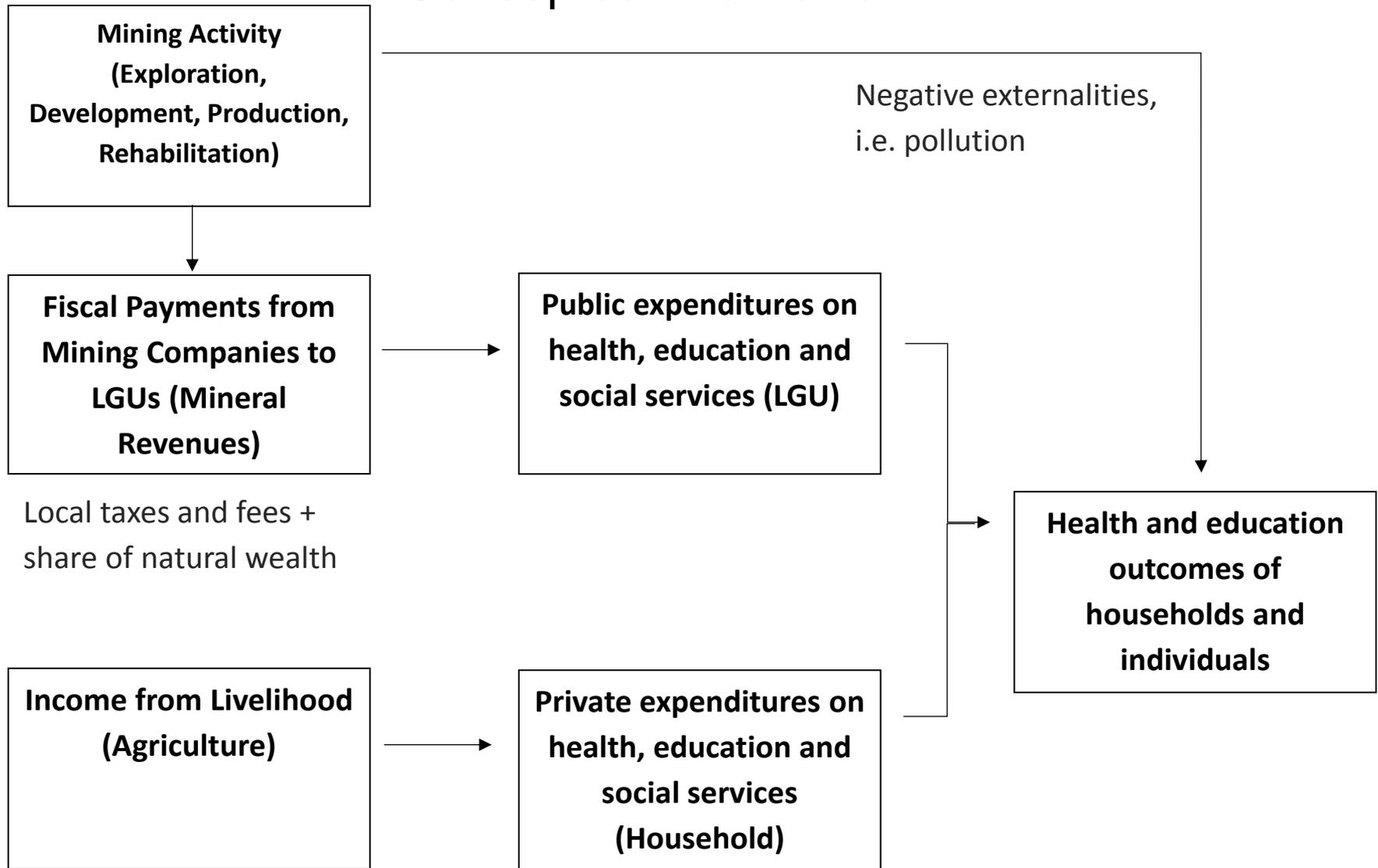
- Do extractive resources benefit communities in resource rich low and middle-income countries?
- vs. national resource curse (Dutch disease, resource volatility, overborrowing)
- Why might a local resource curse exist?
  - Within a country, profits and taxes from resources may accrue outside resource-rich regions (e.g. Metro Manila vs. Surigao del Norte), but negative effects are spatially concentrated.
  - Mining communities bear environmental and social consequences of resource extraction.

# Local channels of mining

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- Broad channels through which mining affects local areas and regions
1. Local demand shock: resource boom can represent an increase in demand for locally supplied inputs, such as labor or intermediate materials, raising wages and spurring employment and migration
    - But enclave capital-intensive projects offer few opportunities for large-scale job creation, even with strong local employment requirements
  2. Local government revenue windfalls: Natural resources can be considered as a source of revenue for local governments.
    - This windfall eases the budget constraint of local governments and supports higher public spending.

# Conceptual Framework



# Similar work

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- Resource booms have no significant impacts on health or educational services in Indonesia (Dettman and Pepinsky 2016)
- Resource abundant cities in China provide fewer public services in education, transportation and housing construction (Hong 2014)
- Mineral taxes increase the provision of two out of four indicators of public goods (Paredes and Rivera 2017).

## PH Fiscal Regime: Taxes collected nationally

Tax	Collecting Agency	Rate	Base
Corporate Income Tax	BIR	30%	
Excise Tax		4%	RA10963
Withholding tax on foreign shareholder dividends		15%	
Withholding tax on royalties to claim owners and IPs		40%	
Withholding tax on interests		20%	
Customs duties	BOC		
VAT on imported materials and equipment		12%	
Excise tax on imported goods			
Royalty in mineral reservation	MGB	5%	
Fees on ports	PPA		

# Local fiscal regime

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- Local governments are entitled to a forty percent (40%) share of the gross collection of the national government from the preceding fiscal year
- Current interpretation:
  - LGUs obtain 40 percent share from the excise tax paid by mining companies and royalty income
  - The other taxes and fees collected from companies become part of the internal revenue and are then shared with all local governments as internal revenue allotment (IRA).
- With fiscal autonomy, LGUs has the power to impose additional taxes and fees (e.g. real property tax, business tax, environmental fees, hauling fees)

## PH Fiscal Regime: Local taxes, collected by LGUs

Tax	Rate	Base
Community tax		Maximum of Php 10,000
Environmental fees		
Extraction fees		
Local business tax	2%	Gross sales
Local wharfage fees		
Mayor's permit		
Mine wastes & tailing fees		
Occupation fees		Php 75.00 to Php 100.00 per hectare
Community tax		
Real property tax - Basic	2%	Assessed value of the real property
Real property tax - SEF		
Registration fee		
Regulatory/Administrative fees		
Rental fees on mineral lands		
Other LGU payments		Public utility charges, delivery trucks, barangay clearance, sand, gravel tax

# Revenue sharing between LGUs

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The 40 percent LGU share from the excise tax is distributed accordingly:

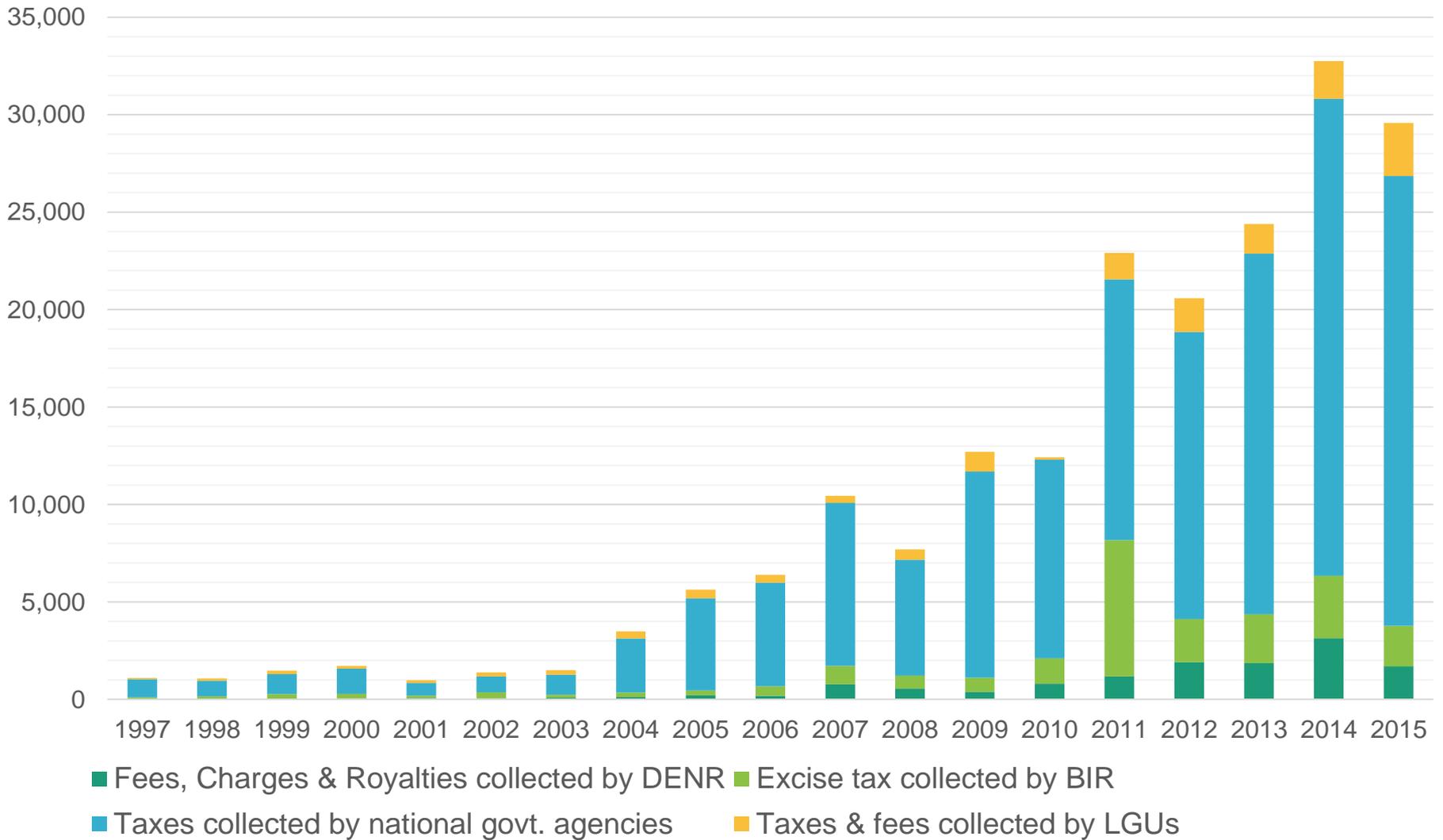
- (1) Province - Twenty percent (20 per cent);
  - (2) Component City/Municipality - Forty-five percent (45 per cent); and
  - (3) Barangay - Thirty-five percent (35 per cent)
- Barangay receives more than province
  - If the natural resources are in a highly urbanized or independent component city, the city will get a 65% share and the barangay 35%
  - If the natural resources are located in two or more provinces or in two or more component cities or municipalities or in two (or more) barangays, the respective share of each LGU is computed on the basis of population (70%) and land area (30%).

# Local fiscal regime

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- Local Government Code mandates LGUs to use revenues generated by national wealth to fund development and livelihood projects
  - Too broad; open to interpretation
  - Local councils can appropriate funds to activities deemed as ‘development projects’
- Weak monitoring of how mineral revenues are spent by LGUs
- Transfers were not historically disaggregated and civil society organization are unable to hold LGUs accountable on budget decisions

# Historical payments of the sector – metallic, non-metallic, inc. small-scale

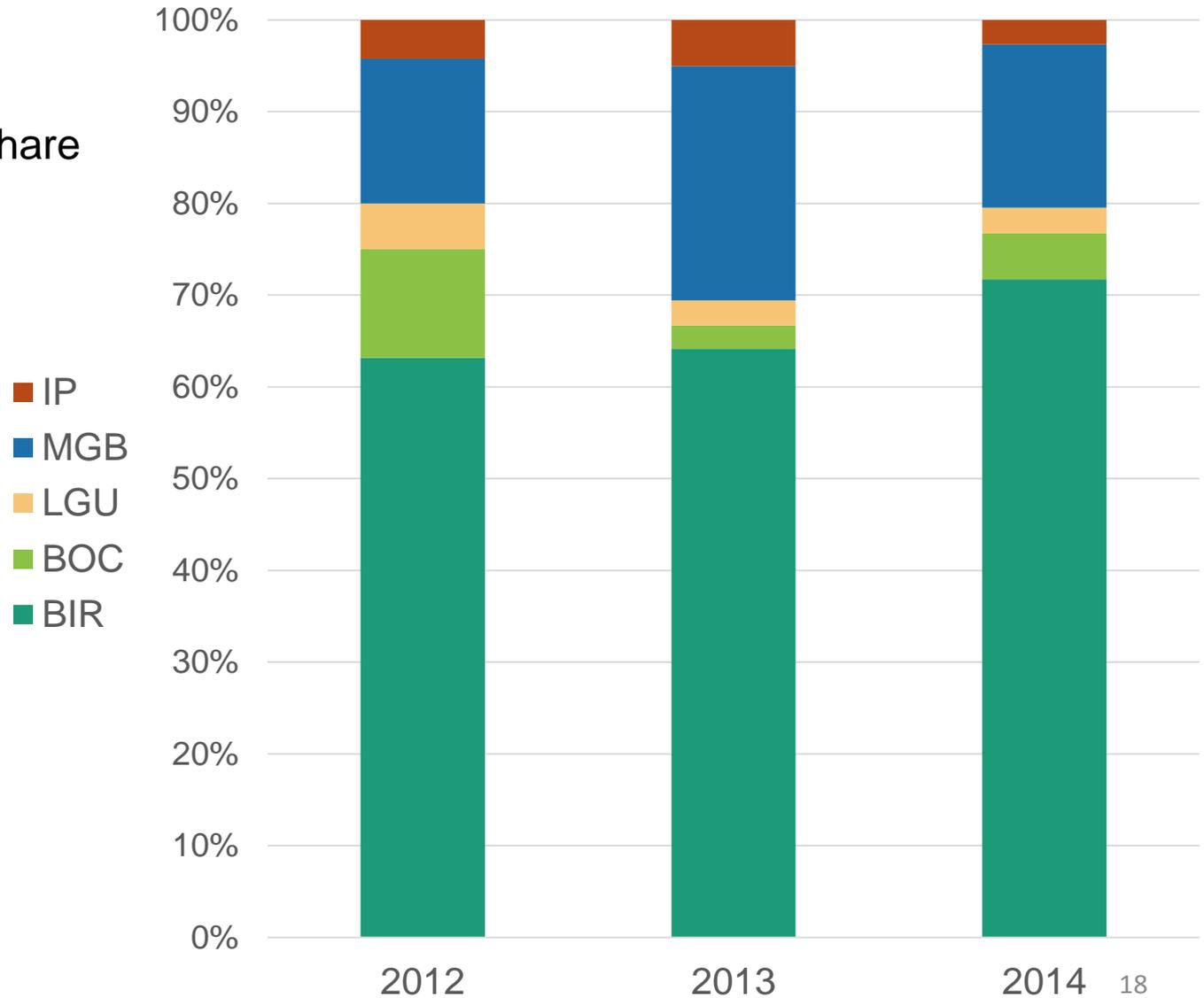


# Large-scale mining companies

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# Payments of large-scale mining contractors, by collecting agency

Payments to LGUs  
comprise a small share  
of total payments



# Data sources

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- Data set combining revenues and expenditures of 1,489 municipalities from 2014 to 2017
  - With mineral revenues from mining contractors operating within municipality administrative boundaries
- Fiscal payments of mining contractors collected by the Environment and Natural Resources Data Management Tool (ENRDMT tool by the BLGF-DOF, supported by UNDP and EITI)
  - Tool made disaggregation of fiscal payments possible
- The ENRDMT reports:
  - LGU shares from national wealth (from excise and royalties from mineral reservations)
  - local taxes collected from mining contractors
  - spending of mining contractors on social development projects (quasi-fiscal payments)

# Data sources

Dataset	Unit	Source	Available Years
Social spending (Expenditures)	LGU	Statement of Receipts and Expenditures (SRE) Bureau of Local Government Finance (BLGF)	1990 – 2017
Shares from national wealth	LGU	Environment and Natural Resources Data Management Tool (ENRDMT-DOF)	2014 – 2017
Local tax collections from mining contractors	LGU	Environment and Natural Resources Data Management Tool (ENRDMT-DOF)	2014 – 2017
SDMP	By firm	Philippine EITI and MGB	2014 – 2017
Operating income	LGU	Statement of Receipts and Expenditures (SRE) Bureau of Local Government Finance (BLGF)	1990 – 2017

# Outcome variable: social spending

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- Municipal social spending
- DOF classifies expenses paid during the fiscal year by function (i.e. purpose for which such expenses were incurred, regardless of agency through which they were made).
- Categories include:
  - (i) Economic services
  - (ii) Debt service
  - (iii) General public services
  - (iv) Health, nutrition and population control
  - (v) Education, manpower and development
  - (vi) Labor and employment
  - (vii) Housing and community development
  - (viii) Social security and social services and welfare
- We focus on (iv), (v), and (viii).

# Explanatory variables

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(1) Total mineral revenues accruing to the local government, which include:

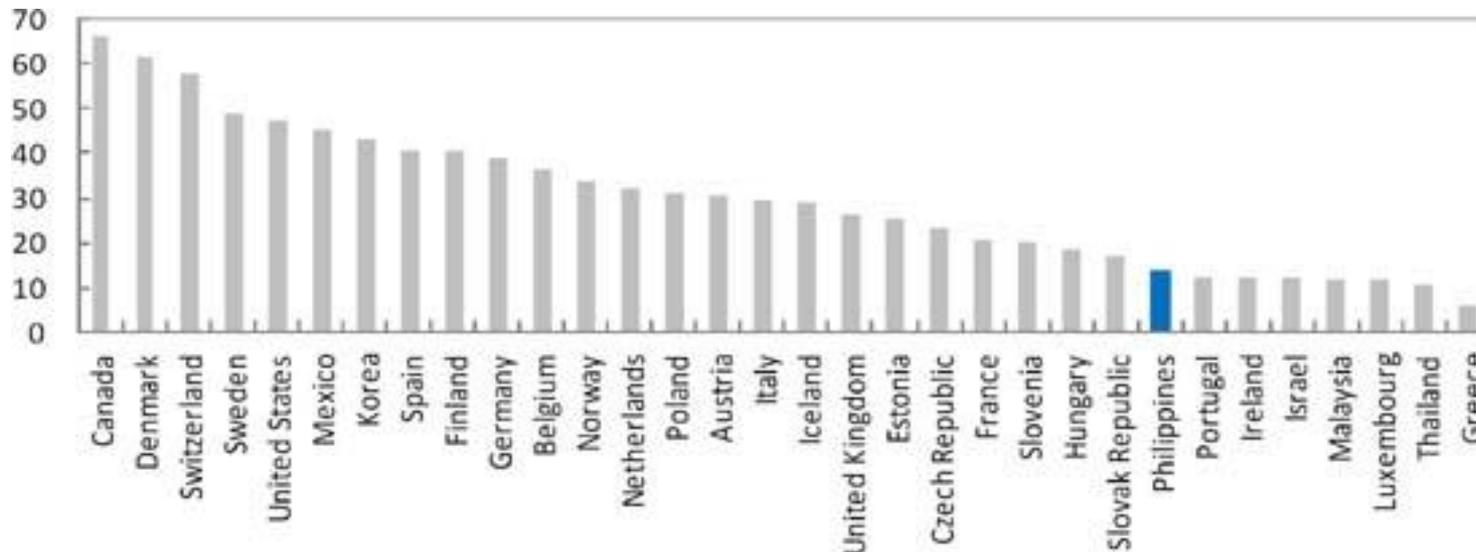
- Local taxes collected from mining companies operating within its administrative boundaries
- Shares in national wealth or intergovernmental transfers from the national government

(2) Quasi-fiscal contributions of mining contractors (SDMP)

- Mandatory in-kind contribution of large-scale mining companies (unlike CSR which is voluntary)
- Provided to host communities
- 1.5% of operating costs
- LGUs can influence SDMP priorities (theoretically)

# Revenue and expenditure patterns

- IMF estimates that local government expenditures represent 14% of general government expenditures, at the low end of comparator economies (Sunley et al. 2012)
  - Local government liabilities, on average, less than 2 percent of GDP



# Summary statistics, local revenues

- Mining localities have higher revenues, on average, and receive more transfers from the central government, in absolute terms.

Indicator	Host Municipalities	Non-mining Municipalities	Total
2014 – 2017	n = 63	n = 1,413	n = 1,476
<i>Mean (In million pesos)</i>			
Locally-sourced revenues	32.29	21.20	21.77
Tax revenues	21.07	11.42	11.87
Nontax revenues	11.23	9.79	9.90
Externally-sourced revenues	117.54	97.93	99.27
Internal Revenue Allotment (IRA)	106.07	93.30	94.35

# Summary statistics, local revenues

- Municipal governments source most of their revenues from external sources
  - On average, locally-sourced revenues are equivalent to 13.31% of total operating income.
  - Host municipalities source more revenues locally (17.27%)
  - Host municipalities less dependent on the IRA (76.74%)

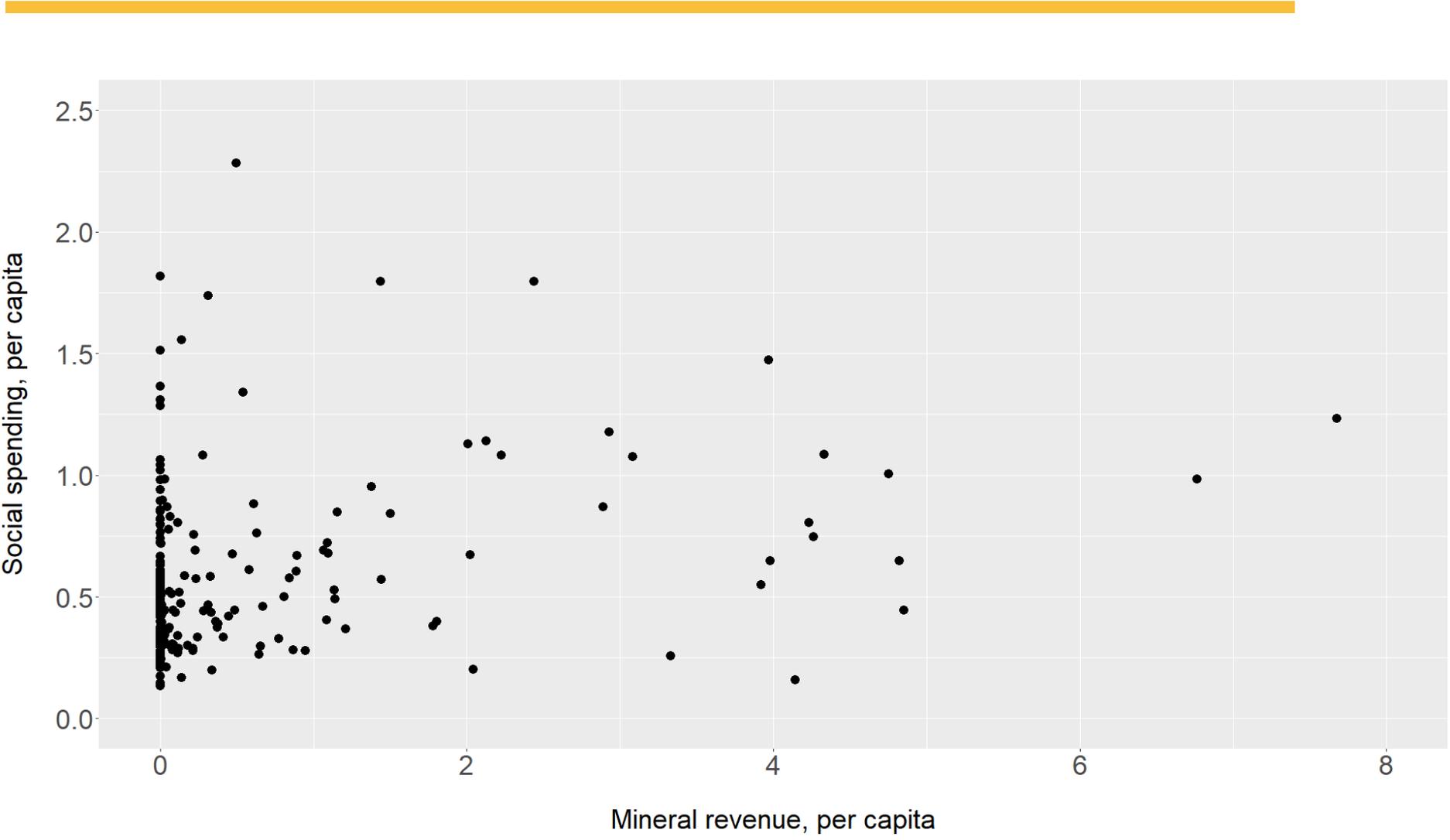
Indicator	Host Municipalities	Non-mining Municipalities	Total
2014 – 2017	n = 63	n = 1,413	n = 1,476
<i>As percentage of total operating income</i>			
Locally-sourced revenues	17.27%	13.14%	13.31%
Tax revenues	10.67%	6.25%	6.43%
Nontax revenues	6.60%	6.89%	6.88%
Externally-sourced revenues	82.73%	86.86%	86.69%
Internal Revenue Allotment (IRA)	76.74%	83.58%	83.30%

# Summary statistics, mining revenues

- As expected, only host municipalities receive revenue from mineral tax
- Mineral revenues only 7.93% of total operating income, but 39.36% of total local sources

Indicator	Host Municipalities	Non-mining Municipalities	Total
2014 – 2017	n = 63	n = 1,413	n = 1,476
<i>As percentage of total operating income</i>			
All unique payments	7.93%	0.00%	0.32%
Local tax collections from mining	5.47%	0.00%	0.22%
Share of national wealth	2.46%	0.00%	0.10%
SDMP	7.26%	0.00%	0.29%
<i>As percentage of total local sources</i>			
All unique payments	39.36%	0.00%	1.58%
Local tax collections from mining	24.23%	0.00%	0.97%
Share of national wealth	15.13%	0.00%	0.61%
SDMP	33.40%	0.00%	1.34%

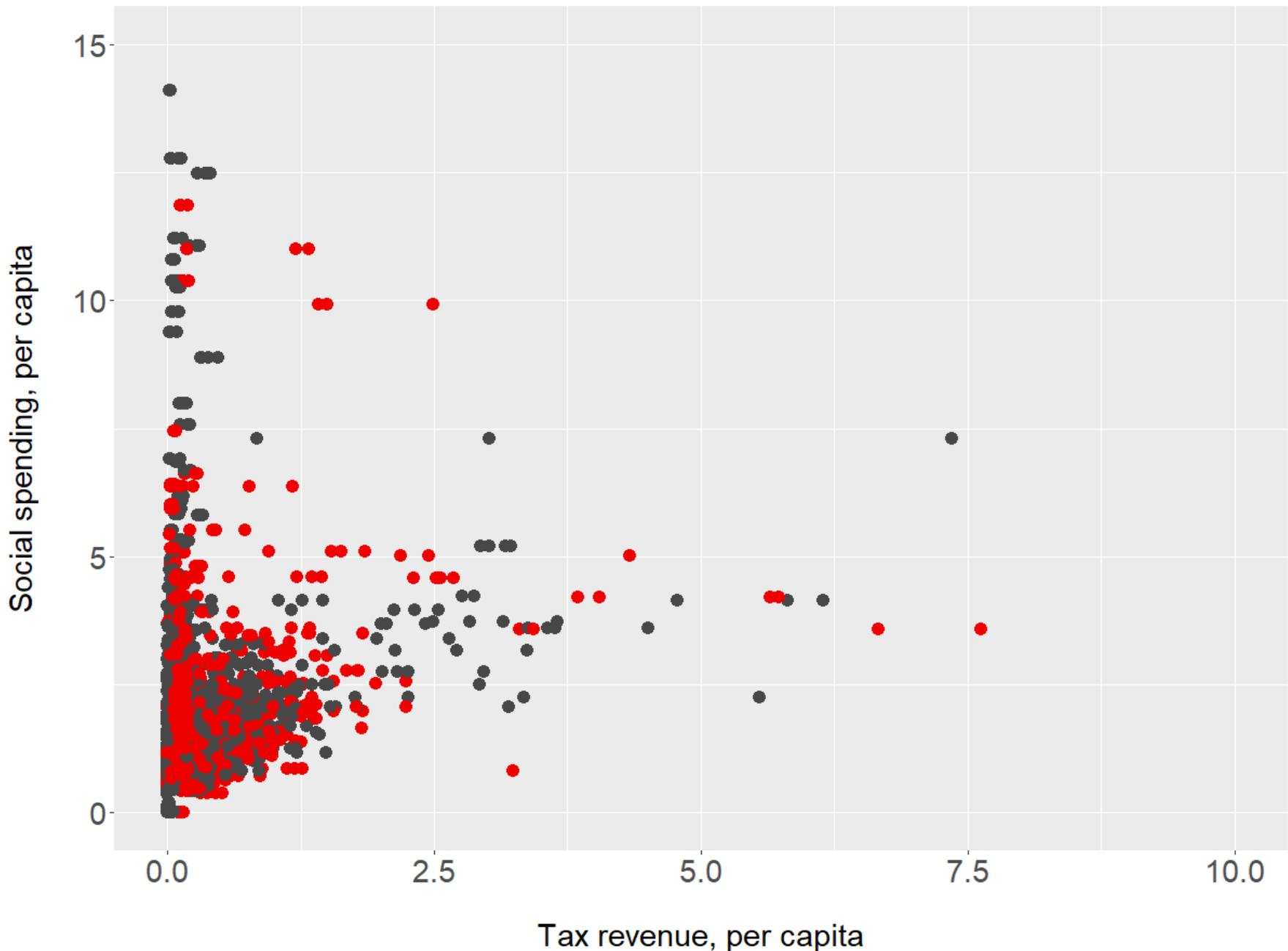
# Mining revenues and social spending, per capita (host municipalities only)



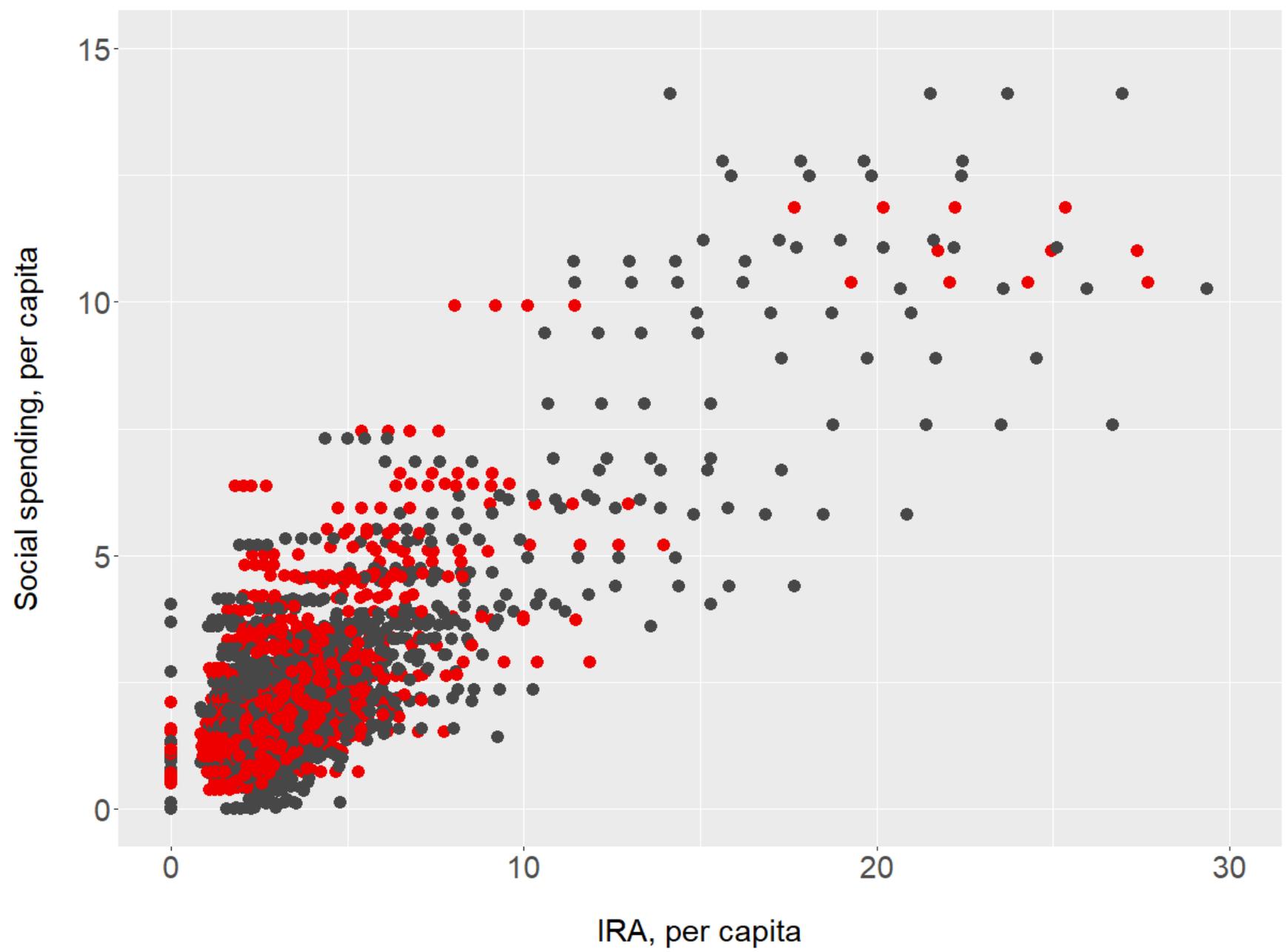
Total revenues and social spending, per capita (red points are mining localities)



Tax revenues and social spending, per capita (red points are mining localities)



# IRA and social spending, per capita (red points are mining localities)



# Summary statistics, social spending

- Host municipalities generally spend more on education, health and social services
- Non-mining municipalities spend more on housing and development

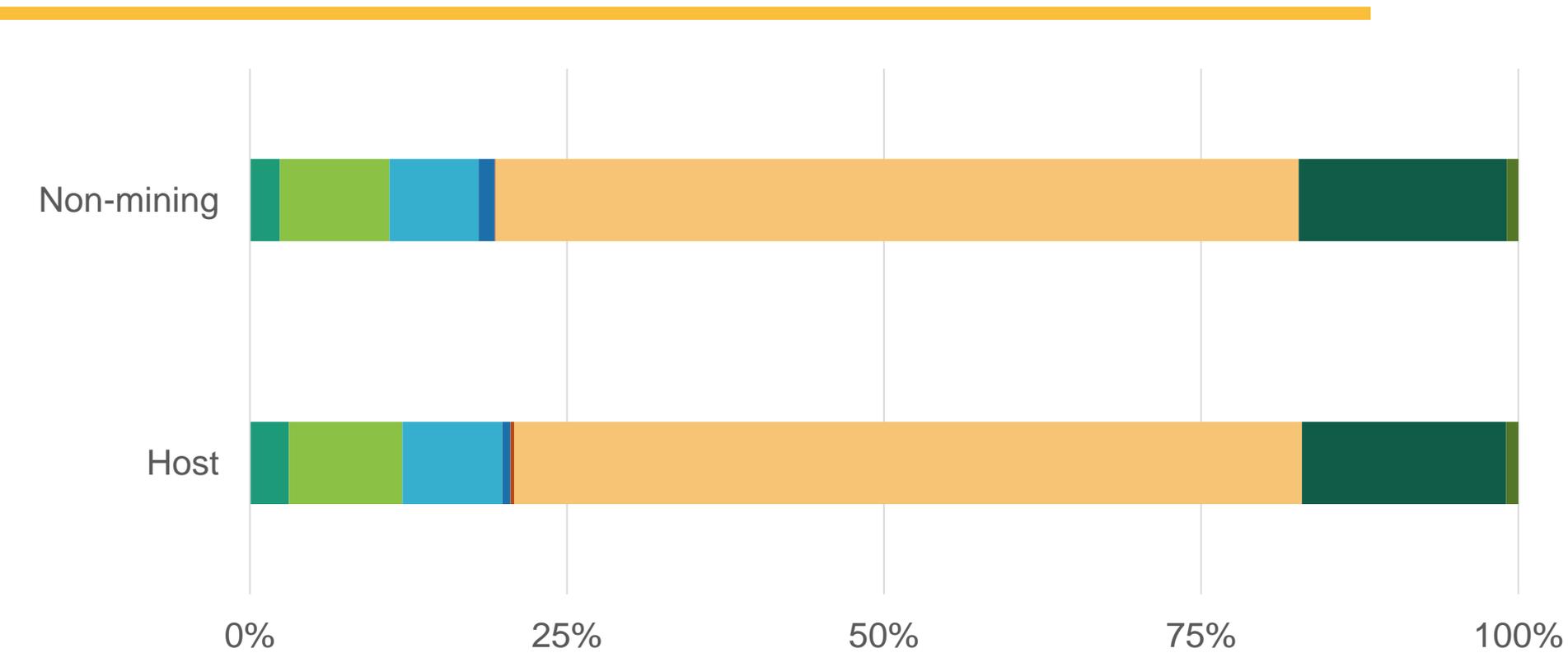
Indicator	Host Municipalities	Non-mining Municipalities	Total
2014 – 2017	n = 63	n = 1,413	n = 1,476
<i>Mean (in million pesos)</i>			
Total productive spending	19.87	16.79	16.91
Education, manpower and development	2.52	2.08	2.10
Health, nutrition and population control	8.96	7.50	7.56
Social services and welfare	7.97	6.11	6.18
Housing and community development	0.42	1.10	1.07
Other major expenditures			
Labor and employment	0.36	0.04	0.06
General public services	64.56	54.78	55.17
Economic services	15.48	14.24	14.29
Debt service	0.86	0.79	0.80

# Summary statistics, social spending (per capita)

- Host municipalities have higher productive spending on a per capita basis
- Non-mining municipalities spend more on housing and economic services on a per capita basis.

Indicator	Host Municipalities	Non-mining Municipalities	Total
2014 – 2017	n = 63	n = 1,413	n = 1,476
<i>Mean (per capita)</i>			
Total productive spending	0.57	0.49	0.50
Education, manpower and development	0.05	0.04	0.04
Health, nutrition and population control	0.25	0.23	0.23
Social services and welfare	0.25	0.20	0.20
Housing and community development	0.01	0.02	0.02
Other major expenditures			
Labor and employment	0.01	0.00	0.00
General public services	1.96	1.94	1.94
Economic services	0.42	0.45	0.45
Debt service	0.02	0.02	0.02

# Spending by category, mining vs. non-mining



- Education, manpower and development
- Health, nutrition and population control
- Social services and welfare
- Housing and community development
- General public services
- Economic services

# Empirical framework

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- Goal: test whether mining revenues are linked to municipal government investments in human capital
  - Outcome variable: municipal government expenditures on health, education, social services, housing
  - The primary covariates of interest are:
    - (1) per capita tax collections from mining;
    - (2) per capita shares from national wealth;
    - (3) quasi-fiscal transfers from mining contractors spent on health and education
  - Balanced panel
    - $n = 1476$ ,  $T = 4$ ,  $N = 5904$

# Baseline model, OLS

$$S_{jt} = \alpha + \beta r_{jkt} + \sigma X_{jkt} + \varepsilon_{jkt} \quad (1)$$

Where municipality is denoted by  $j$  and time  $t$

$S_{jt}$	Total per capita social spending of municipality $j$ at year $t$
$r_{jkt}$	Per capita mineral revenues  Local tax collections from mining received by municipality $j$ at year $t$ Shares from national wealth received by municipality $j$ at year $t$ SDMP paid to municipality $j$ at year $t$
$X_{jt}$	Operating income of municipality, net of mining revenues
$\varepsilon_{jt}$	Idiosyncratic error term

- The parameter of interest is  $\beta$ , which indicates the marginal effect that an extra peso of a mineral revenues exerts on social spending of mining localities relative to non-mining localities

# Baseline model, with year and municipality fixed-effects

$$S_{jt} = \alpha + \beta r_{jt} + \sigma X_{jt} + \delta_j + t + \varepsilon_{jt} \quad (2)$$

Where municipality is denoted by  $j$ , and time  $t$

$\delta_j$	Municipality fixed-effects -- vector of dummy variables that take on value on 1 for all municipalities $j$ and 0 if otherwise (controls for unit-specific fixed effects)
$t$	Year fixed-effects
$\varepsilon_{jt}$	Idiosyncratic error term

Estimate (1) using OLS, (2) using a fixed-effects estimator (FE).

- The fixed-effects model exploits variation of social spending within a LGU over time
- Because unobserved time-invariant LGU characteristics may impact or bias the outcome variable (e.g. political economy), FE controls for within-LGU covariates

# Estimation results, baseline model, OLS

- Local tax collections from mining increases spending on health.
- Shares from national wealth increase spending social services.
- No impact on education spending.
- Generally, higher locally-sourced revenues and external sources (IRA) implies increased social spending.

	Dependent variable:		
	Health	Education	Social Services
	(1)	(2)	(3)
Local tax collections from mining, municipality	.051** (.024)	-.008 (.048)	.010 (.030)
Shares from national wealth (mining), municipality	-.001 (.023)	-.038 (.046)	.069** (.029)
SDMP, municipality	-.012 (.015)	.007 (.030)	.003 (.019)
External sources, less national wealth	.004*** (.0003)	-.0002 (.001)	.005*** (.0003)
Non-tax revenue	.037*** (.007)	.010 (.015)	-.022** (.009)
Tax on real property, less real property mining tax	.021*** (.007)	.077*** (.015)	.013 (.009)
Tax on businesses, less business mining tax	.042*** (.012)	.094*** (.024)	-.005 (.015)
Observations	5,904	5,904	5,904
R <sup>2</sup>	.073	.014	.058

Note: \* p<0.1; \*\* p<0.05; \*\*\* p<0.01; Cluster-robust standard errors reported

# Estimation results, baseline model, FE

- Controlling for time invariant within-municipality covariates:
  - No impact on health and education
  - Local tax collections from mining and shares from national wealth now have a negative impact on social services

	Dependent variable:		
	Health	Education	Social services
	(1)	(2)	(3)
Local tax collections from mining, municipality	.013 (.011)	-.004 (.070)	-.046** (.023)
Shares from national wealth, municipality	.004 (.011)	-.029 (.074)	-.138*** (.024)
SDMP, municipality	.002 (.007)	.006 (.045)	.037** (.015)
External sources, less national wealth	.006*** (.0004)	.002 (.003)	.008*** (.001)
Non-tax revenue	.016*** (.004)	.029 (.027)	.005 (.009)
Tax on real property, less real property mining tax	.012*** (.004)	-.002 (.024)	.001 (.008)
Tax on businesses, less business mining tax	.056*** (.008)	.046 (.054)	.073*** (.018)
Observations	5,904	5,904	5,904
R <sup>2</sup>	.065	.001	.037
Note:	* p<0.1; ** p<0.05; *** p<0.01		

# Crowding out hypothesis

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- What if local governments use mineral revenues as a substitute to other locally sourced taxes?
- Mineral revenues might crowd out primary local taxes, e.g. real property tax, business tax
  - Notion that host municipalities that rely on mineral as a source of revenue have less incentive to collect real property tax and business taxes
  - Mineral revenues might ease tax burden at the cost of weaker enforcement of collection

# Crowding out hypothesis

- Test for crowding-out: other taxes now LHS, regressed on mineral revenues

$$y_{jt} = \gamma_0 + \gamma_1 r_{jt} + \gamma_2 r_{jt-1} + \sigma X_{jt} + t + \delta_j + \varepsilon_{jt}$$

$y_{jt}$	Total per capita real property tax collected by municipality j at time t (net of mining revenues) OR Total per capita business tax collected by municipality j at time t (net of mining revenues)
$r_{jt}$	Mineral Revenues
$r_{jt-1}$	Mineral Revenues, lagged one period

- Parameter of interest is  $\gamma_1$
- If  $\gamma_1 < 0$ , an additional peso of mineral revenues crowds out real property tax (or business tax)

# Crowding out, results

- Mineral revenues crowds out the real property tax
- SDMP crowds out local business tax, but higher local tax collections from mining increase business tax

	Dependent variable:	
	Real property tax	Local business tax
	(1)	(2)
Local tax collections from mining, municipality	-.435*** (.043)	.246*** (.020)
Shares from national wealth, municipality	-.617*** (.034)	-.006 (.016)
SDMP, municipality	-.319*** (.031)	-.046*** (.015)
External sources, less national wealth	.001 (.002)	.002** (.001)
Non-tax revenue	.057*** (.017)	.054*** (.008)
Observations	4,428	4,428
R <sup>2</sup>	.195	.071
Adjusted R <sup>2</sup>	-.210	-.397
F Statistic (df = 7; 2945)	102.089***	31.997***
Note:	*p<0.1; **p<0.05; ***p<0.01	

# Future directions for research

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- Testing for inertia
- Spend-tax hypothesis
- Local migration and mining booms

# Appendix: Testing for inertia

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- What if inertia drives local decisions on public expenditures?
  - OLS and FE inconsistently estimate parameters of interest
  - Test for inertia: include outcome variable (social spending) lagged one period in estimation

$$S_{jt} = \alpha + \beta R_{jt} + \lambda S_{jt-1} + \sigma X_{jt} + \delta_j + \varepsilon_{jt}$$

- Null hypothesis: No inertia in local social expenditures of municipal government
- Parameter of interest is  $\lambda$
- If null hypothesis is reject, rely on dynamic panel data estimation, e.g. Arellano-Bond generalized methods of moments.