Local Public Expenditure and Private Firm Performance: Using Religious Denominations for Causal Inference

Henrique Alpalhão, Marta Lopes,
João Pereira dos Santos, José Tavares

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Introduction

A timeless question: how does fiscal policy impact economic performance?

- Fiscal multiplier (Kahn, 1931)

A modern interpretation: how does **local** fiscal policy impact economic performance?

- Favero et al. (2011)
  - Lower cultural and legal heterogeneity
  - Curbs information loss

Some examples: Brückner and Tuladhar (2013), Suárez Serrato and Wingender (2016), Cerqua and Pellegrini (2018), Chodorow-Reich (2019), Auerbach et al. (2019)

A timeless challenge

Local economic performance =
$\beta_0 + \beta_1$ *Local government expenditure* $+ \mu_{i,t}$

Endogeneity and reverse causality concerns

- Automatic stabilizer character of government expenditure (Suárez Serrato and Wingender, 2016)
- Lower regional development implies higher fiscal intervention (Cerqua and Pellegrini, 2018)
- Politically-related availability of funds for local governments (Nakamura and Steinsson, 2014)

Solution: IV framework for government expenditure

Purpose

Prevailing instruments are either country-specific instruments or natural experiments

- Suárez Serrato and Wingender (2016): US Census shock
- Cerqua and Pellegrini (2018): Entrepreneurs' self-reporting of employment creation expectations, as per Italian legal requirement for funding applications
- Auerbach et al. (2019): US Department of Defense contracts

Our purpose: to propose an easily obtainable instrument for local government expenditure and apply it to the Portuguese case.

Local governments in mainland Portugal (Laws 159/99, 169/99 and 5-A/2002)

Municipalities (278):

- Policy instruments: investment, employment initiatives, tourism promotion, firm licensing
- Revenues mostly comprised of central government transfers (Carvalho et al., 2018)

Parishes (4037, 1 to 89 per municipality):

- Outcome of ancient traditions and disputes (Santos, 1995)
- Policy instruments: investment, provision of public services, cooperation with private entities, local development
- Municipalities may delegate competences
- Revenues almost completely comprised of municipality transfers

Note: municipalities and parishes are prior to the 2013 reorganization via laws 22/2012 and 11-A/2013.

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Religiously denominated parishes (628, 0 to 30 per municipality):

- More traditional and associated with a patron saint

The instrument

Our suggestion: number of jurisdictions and local identity as an instrument for municipal expenditure

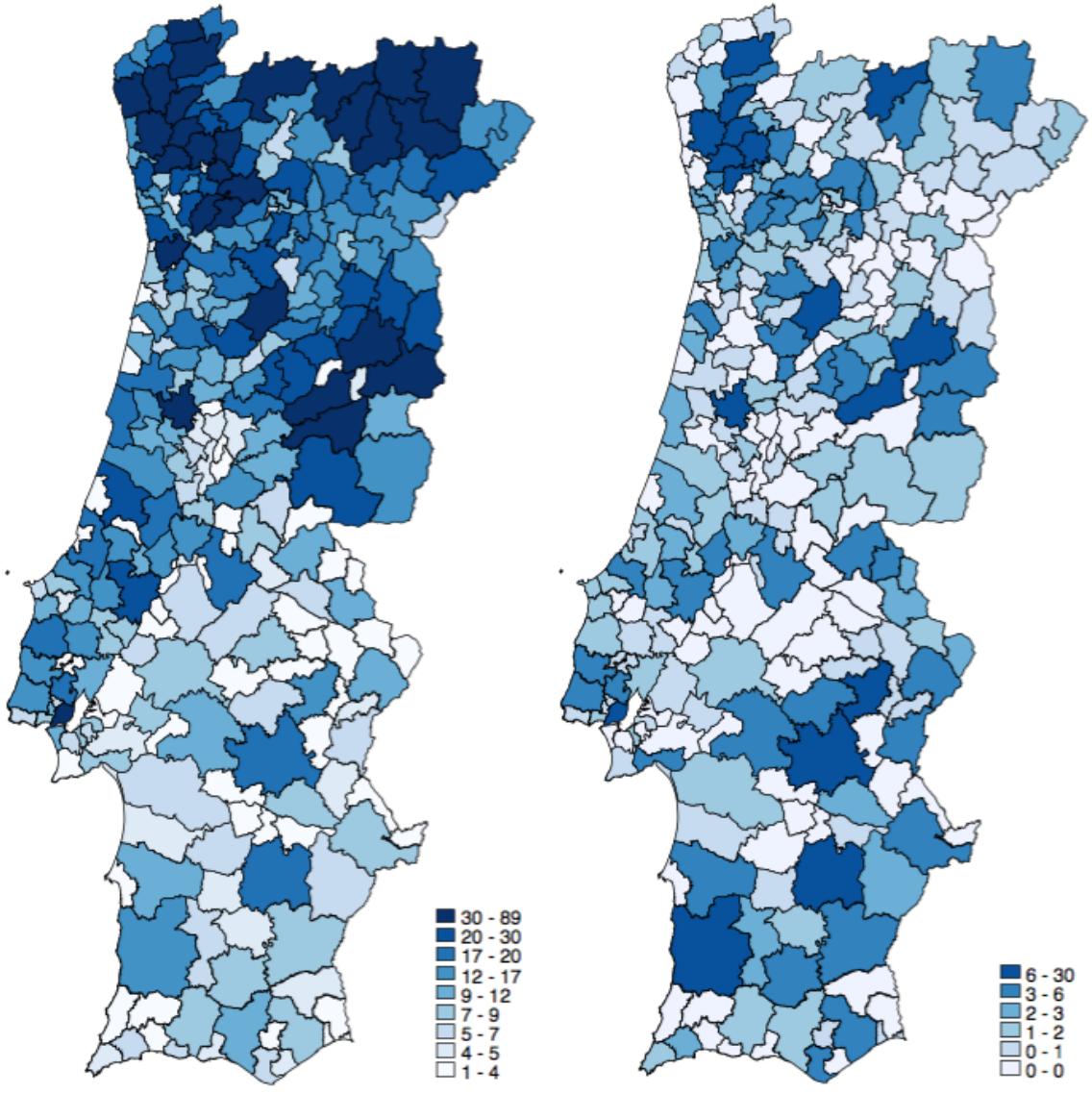
1. Number of parishes per municipality
2. Number of religiously denominated parishes per municipality

Tornell and Lane (1999): the voracity effect

- Numerous, powerful and competing agents
- Discretionary allocation of government transfers between them
- A positive economic shock generates a more-than-proportional increase in fiscal redistribution

For any circumstance that warrants local demands for increased central government transfers, a municipality with more powerful/competing agents - in our case, parishes - should, via lobbying behavior, secure a higher amount of funds than one with a lower amount of parishes, allowing for relatively higher expenditure.

Figure 1: Number of parishes (left) and religiously-denominated parishes (right) per municipality (1999)



Variance-covariance matrix

Table A1: Variance-covariance matrix

	# Parishes	*# Rel. Parishes*	ln(*Total Curr Exp*)	ln(*Total Exp*)
# Parishes	1			
# Rel. Parishes	0.618	1		
ln(*Total Curr Exp*)	0.381	0.465	1	
ln(*Total Exp*)	0.424	0.468	0.984	1

Reported estimates are for our regression datasets: *# Parishes* and *# Rel. Parishes* correspond to the values set in 1999, while ln(*Total Curr Exp*) and ln(*Total Exp*) are two-year averages of 2005 and 2006 values, for all 278 mainland municipalities.

Reduced-form estimation

Table A2: Reduced-form estimation

	$Y = \ln(Total\ GVA)$		$Y = \ln(Total\ Sales)$	
	(1)	(2)	(3)	(4)
$\ln(Total\ Curr\ Exp)$	1.336***	1.367***	1.327***	1.395***
	(0.111)	(0.100)	(0.116)	(0.106)
$\#\ Parishes$	0.005		0.006	
	(0.004)		(0.004)	
$\#\ Rel.\ Parishes$		0.009		0.001
		(0.012)		(0.012)
Obs.	277	277	278	278
$Adjusted\ R^2$	0.855	0.854	0.858	0.858
$\ln(Total\ Exp)$	1.328***	1.321***	1.328***	1.357***
	(0.118)	(0.104)	(0.123)	(0.110)
$\#\ Parishes$	0.002		0.003	
	(0.004)		(0.004)	
$\#\ Rel.\ Parishes$		0.012		0.004
		(0.012)		(0.013)
Obs.	277	277	278	278
$Adjusted\ R^2$	0.845	0.845	0.850	0.850
NUTS2	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓

This table reports the reduced-form OLS estimation, which tentatively investigates if our instruments impact our dependent variables when the expenditure variables are present. The fact that they do not seems to suggest that they are adequate choices for an IV framework. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Decentralization and endogeneity

Decentralization might impact the effectiveness of policy and thus needs to be controlled for

- Catering to more homogeneous and specific preferences (Faguet, 2014)
- Lower corruption (Shah, 2006)
- Lower public good productive efficiency and reduced human capital (Faguet, 2014)

But: in our case it should not impact the amount of parish expenditure given how it is almost fully funded by municipality expenditure.

A tale of two instruments

 # Parishes

- More generally applicable
- May incorporate the impact of decentralization on policy effectiveness

 # Rel. Parishes

- Less likely to incorporate decentralization
- Stands for local identity, and hence voracity
- More voracious parishes should not be more or less competent in providing public goods

Religious parishes and received transfers (OLS)

Table 1: Religious parishes and received transfers

	$Y = \ln(Total\ Parish\ Transfers)$				
	(1)	(2)	(3)	(4)	(5)
Religiously Named	0.088***	0.088***	0.062**	0.062**	0.060**
	(0.033)	(0.033)	(0.030)	(0.030)	(0.027)
Obs.	40 340	40 340	40 340	40 340	40 340
Adjusted R^2	0.302	0.302	0.459	0.456	0.587
Year	✓	✓	✓	✓	✓
NUTS2	✓				
NUTS2*Year		✓			
NUTS3			✓		
NUTS3*Year				✓	
Municipalities					✓

This table reports preliminary religiously-named/transfers estimation results, a simple yearly OLS panel regression for 4034 of the 4037 mainland parishes, from 2003 to 2012. The missing parishes are Vale de Amoreira, Moita and Agualva-Cacém, for which there is no data on received transfers. Year fixed effects are included throughout and several different regional fixed effects are tested, displaying consistent and robust results. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Empirical strategy

Data: all 278 Portuguese mainland municipalities, 2005-2008

IV framework:

1. $\textit{Municipal Expenditure}_{i,t-1} = \beta_0 + \beta_1 \# \textit{Parishes}_{i,1999} + \beta_n \textit{Covariates}_{i,t-1} + \mu_{i,t}$
2. $\textit{Private Firm Performance}_{i,t} = \beta_0 + \beta_1 \textit{Municipal Expenditure}_{i,t-1} + \beta n \textit{Covariates}_{i,t-1} + \varepsilon_{i,t}$

Yearly averages (t=2007/2008; t-1=2005/2006)

Variables

1. $\textit{Municipal Expenditure}_{i,t-1} = \beta_0 + \beta_1 \#\,\textit{Parishes}_{i,1999} + \beta_n \textit{Covariates}_{i,t-1} + \mu_{i,t}$
2. $\textit{Private Firm Performance}_{i,t} = \beta_0 + \beta_1 \textit{Municipal Expenditure}_{i,t-1} + \beta n \textit{Covariates}_{i,t-1} + \varepsilon_{i,t}$

Municipal Expenditure:

- ln(*Total current expenditure*)
- ln(*Total expenditure*)

Private Firm Performance:

- ln(*Total GVA*)
- ln(*Total sales*)

Covariates

Decentralization: Population density

Economic exuberance: Highly-educated workers; Local tax rates (IMI and derrama); Industrial areas; Highway connection

Regional wealth: Total urban area; Dependency ratio; Per capita electricity consumption

Political factors: % of leftist mandates; Town hall majority

Output gap: Local unemployment rate

Fixed effects: NUTS2 (5 mainland Portuguese regions - Norte, Centro, Lisboa, Alentejo and Algarve)

Descriptive statistics

Table 2: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Private Firm Performance (2007-08 averages)					
$\ln(Total\,GVA)$	277	17.538	1.628	13.802	22.64
$\ln(Total\,Sales)$	278	18.968	1.601	15.531	24.048
Municipal Expenditure (2005-06 averages)					
$\ln(Total\,Curr\,Exp)$	278	9.086	0.826	7.846	12.896
$\ln(Total\,Exp)$	278	9.62	0.783	8.228	13.231
Instrument (1999 values)					
# Parishes	278	14.522	12.772	1	89
# Rel. Parishes	278	2.259	3.293	0	30
Controls (2005-06 averages)					
Total Urban Area	278	11.387	14.796	0.334	91.279
Electricity Cons.	278	4274.38	4663.8	1569.905	60442.36
IMI	278	0.706	0.109	0.4	0.8
Industrial Area	278	0.014	0.023	0	0.15
Unemp. Rate	278	6.313	2.189	1.612	14.217
Highways	278	0.538	0.499	0	1
Tertiary Educ.	278	0.058	0.028	0.02	0.256
Pop. Density	278	0.312	0.856	0.006	7.359
Leftist Mandates	278	0.543	0.245	0	1
Mayor Majority	278	0.896	0.222	0	1
Business Tax Rate	278	0.05	0.047	0	0.1

$\ln(Total\,GVA)$ displays 277, rather than 278 observations. This is due to the negative average 2007-08 total GVA in the Aljustrel municipality - this specific observation is dropped in the logarithmization process.

Baseline results

Table 3: Baseline results (unweighted)

	$\ln(Total\ GVA)$			$\ln(Total\ Sales)$		
	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(Total\ Curr\ Exp)$	1.396***	1.514***	1.493***	1.399***	1.542***	1.413***
	(0.088)	(0.117)	(0.141)	(0.092)	(0.114)	(0.142)
Obs.	277	277	277	278	278	278
$Adjusted\ R^2$	0.854	0.853	0.854	0.858	0.856	0.858
First-stage instrument		0.026***	0.072***		0.026***	0.072***
		(0.003)	(0.009)		(0.003)	(0.009)
First-stage F test		97.50	63.39		97.71	63.39
$\ln(Total\ Exp)$	1.359***	1.406***	1.486***	1.368***	1.432***	1.406***
	(0.089)	(0.111)	(0.139)	(0.093)	(0.106)	(0.138)
Obs.	277	277	277	278	278	278
$Adjusted\ R^2$	0.845	0.845	0.844	0.850	0.850	0.850
First-stage instrument		0.028***	0.072***		0.028***	0.072***
		(0.003)	(0.009)		(0.003)	(0.009)
First-stage F test		108.19	68.26		108.34	68.24
NUTS2	✓	✓	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓	✓	✓
Inst.: $\#\ Parishes$		✓			✓	
Inst.: $\#\ Rel.\ Parishes$			✓			✓

NUTS2 (in their 2002 version) refers to the used geographical control variable - the Portuguese mainland regions (5 in number: Norte, Centro, Lisboa, Alentejo and Algarve). The reported IV estimations are unweighted. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Robustness

- Region fixed effects: replace NUTS2 with NUTS3
- Drop all Lisbon and Oporto metropolitan area observations
- Drop all coastal municipalities
- Deeper crisis setting: 2009-2012 timeframe (t=2011/12; t-1=2009/10)

Robustness: region fixed effects

Table 4: Robustness tests: region fixed effects

	$Y = \ln(Total\,GVA)$		$Y = \ln(Total\,Sales)$	
	$\#\,Parishes$	$\#\,Rel.\,Parishes$	$\#\,Parishes$	$\#\,Rel.\,Parishes$
	(1)	(2)	(3)	(4)
$\ln(Total\,Curr\,Exp)$	1.544***	1.360***	1.551***	1.272***
	(0.101)	(0.126)	(0.105)	(0.117)
Obs.	277	277	278	278
$Adjusted\,R^2$	0.899	0.899	0.902	0.902
First-stage instrument	0.033***	0.083***	0.033***	0.083***
	(0.003)	(0.010)	(0.003)	(0.010)
First-stage F test	151.85	74.49	152.01	74.58
$\ln(Total\,Exp)$	1.488***	1.372***	1.496***	1.283***
	(0.098)	(0.132)	(0.100)	(0.119)
Obs.	277	277	278	278
$Adjusted\,R^2$	0.897	0.898	0.903	0.903
First-stage instrument	0.034***	0.082***	0.034***	0.082***
	(0.003)	(0.009)	(0.003)	(0.009)
First-stage F test	164.15	80.51	164.25	80.59
NUTS3	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓
Inst.: $\#\,Parishes$	✓		✓	
Inst.: $\#\,Rel.\,Parishes$		✓		✓

NUTS3 (in their 2002 version) refers to the used geographical control variable - the Portuguese mainland sub-regions (28 in number: Alentejo Central, Alentejo Litoral, Algarve, Alto Alentejo, Alto Trás-os-Montes, Ave, Baixo Alentejo, Baixo Mondego, Baixo Vouga, Beira Interior Norte, Beira Interior Sul, Cova da Beira, Cávado, Douro, Dão-Lafões, Entre Douro e Vouga, Grande Lisboa, Grande Porto, Lezíria do Tejo, Minho-Lima, Médio Tejo, Oeste, Península de Setúbal, Pinhal Interior Norte, Pinhal Interior Sul, Pinhal Litoral, Serra da Estrela and Tâmega). The reported IV estimations are unweighted. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Robustness: no metropolitan areas

Table 5: Robustness tests: no metropolitan areas

	$Y = \ln(Total\,GVA)$		$Y = \ln(Total\,Sales)$	
	$\#\,Parishes$	$\#\,Rel.\,Parishes$	$\#\,Parishes$	$\#\,Rel.\,Parishes$
	(1)	(2)	(3)	(4)
$\ln(Total\,Curr\,Exp)$	1.466***	1.366***	1.512***	1.293***
	(0.129)	(0.177)	(0.124)	(0.182)
Obs.	243	243	244	244
$Adjusted\,R^2$	0.817	0.817	0.824	0.821
First-stage instrument	0.027***	0.085***	0.027***	0.085***
	(0.003)	(0.011)	(0.003)	(0.011)
First-stage F test	98.47	61.01	98.72	61.20
$\ln(Total\,Exp)$	1.353***	1.368***	1.395***	1.295***
	(0.128)	(0.186)	(0.121)	(0.189)
Obs.	243	243	244	244
$Adjusted\,R^2$	0.805	0.805	0.813	0.811
First-stage instrument	0.029***	0.085***	0.029***	0.085***
	(0.003)	(0.010)	(0.003)	(0.010)
First-stage F test	109.09	64.86	109.24	65.07
NUTS2	✓	✓	✓	✓
No metropolitan areas	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓
Inst.: $\#\,Parishes$	✓		✓	
Inst.: $\#\,Rel.\,Parishes$		✓		✓

These estimations correspond to those in Table 3 without considering municipalities in the metropolitan areas of Lisbon and Porto. Data for the following municipalities was dropped: Cascais, Lisboa, Loures, Mafra, Oeiras, Sintra, Vila Franca de Xira, Amadora, Odivelas, Alcochete, Almada, Barreiro, Moita, Montijo, Palmela, Seixal, Sesimbra, Setúbal, Arouca, Espinho, Santa Maria da Feira, Oliveira de Azeméis, São João da Madeira, Gondomar, Maia, Matosinhos, Paredes, Porto, Póvoa de Varzim, Santo Tirso, Valongo, Vila do Conde, Vila Nova de Gaia and Trofa. The reported IV estimations are unweighted. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Robustness: no coastal regions

Table 6: Robustness tests: no coastal regions

	$Y = \ln(Total\ GVA)$		$Y = \ln(Total\ Sales)$	
	$\#\ Parishes$	$\#\ Rel.\ Parishes$	$\#\ Parishes$	$\#\ Rel.\ Parishes$
	(1)	(2)	(3)	(4)
$\ln(Total\ Curr\ Exp)$	1.422***	1.383***	1.440***	1.290***
	(0.121)	(0.148)	(0.120)	(0.155)
Obs.	225	225	226	226
$Adjusted\ R^2$	0.824	0.823	0.831	0.828
First-stage instrument	0.026***	0.085***	0.026***	0.085***
	(0.003)	(0.010)	(0.003)	(0.010)
First-stage F test	100.38	72.49	100.64	72.69
$\ln(Total\ Exp)$	1.328***	1.398***	1.345***	1.304***
	(0.121)	(0.154)	(0.119)	(0.159)
Obs.	225	225	226	226
$Adjusted\ R^2$	0.807	0.808	0.816	0.815
First-stage instrument	0.028***	0.084***	0.028***	0.084***
	(0.003)	(0.010)	(0.003)	(0.010)
First-stage F test	105.84	74.14	106.04	74.36
NUTS2	✓	✓	✓	✓
No coastal municipalities	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓
Inst.: $\#\ Parishes$	✓		✓	
Inst.: $\#\ Rel.\ Parishes$		✓		✓

These estimations correspond to those in Table 3 without considering coastal municipalities. Data for the following municipalities was dropped: Caminha, Viana do Castelo, Esposende, Póvoa de Varzim, Vila do Conde, Matosinhos, Porto, Vila Nova de Gaia, Espinho, Ovar, Murtosa, Aveiro, Ílhavo, Vagos, Mira, Cantanhede, Figueira da Foz, Pombal, Leiria, Marinha Grande, Alcobaça, Nazaré, Caldas da Rainha, Óbidos, Peniche, Lourinhã, Torres Vedras, Mafra, Sintra, Cascais, Oeiras, Lisboa, Almada, Sesimbra, Setúbal, Alcácer do Sal, Grândola, Santiago do Cacém, Sines, Odemira, Aljezur, Vila do Bispo, Lagos, Portimão, Lagoa, Silves, Albufeira, Loulé, Faro, Olhão, Tavira and Vila Real de Santo António. The reported IV estimations are unweighted. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Robustness: 2009-12 timeframe

Table 7: Robustness tests: timeframe

	$Y = \ln(Total\ GVA)$			$Y = \ln(Total\ Sales)$		
	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(Total\ Curr\ Exp)$	1.426***	1.490***	1.494***	1.444***	1.544***	1.460***
	(0.088)	(0.119)	(0.145)	(0.098)	(0.117)	(0.149)
Obs.	278	278	278	278	278	278
$Adjusted\ R^2$	0.835	0.834	0.834	0.827	0.826	0.827
First-stage instrument		0.027***	0.073***		0.027***	0.073***
		(0.002)	(0.009)		(0.002)	(0.009)
First-stage F test		120.50	71.53		120.50	71.53
$\ln(Total\ Exp)$	1.401***	1.481***	1.510***	1.402***	1.535***	1.476***
	(0.085)	(0.126)	(0.149)	(0.096)	(0.123)	(0.153)
Obs.	278	278	278	278	278	278
$Adjusted\ R^2$	0.829	0.829	0.828	0.817	0.816	0.817
First-stage instrument		0.027***	0.072***		0.027***	0.072***
		(0.003)	(0.008)		(0.003)	(0.008)
First-stage F test		103.89	73.01		103.89	73.01
NUTS2	✓	✓	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓	✓	✓
Inst.: $\#\ Parishes$		✓			✓	
Inst.: $\#\ Rel.\ Parishes$			✓			✓

These estimations correspond to those in Table 3 using a different timeframe - $\ln(Total\ GVA)$ and $\ln(Total\ Sales)$ correspond to the average of their yearly 2011 and 2012 values, while all other covariates correspond to the average of their yearly 2009 and 2010 values. $Nr.\ Parishes$ and $Nr.\ Rel.\ Parishes$, as before, correspond to their 1999 values. The reported IV estimations are unweighted. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Discussion

Both instruments, across the board:

- are judged exogenous
- are significant at the 1% level in the 1st stage estimations
- Yield positive, significant (1%) and equivalent results for the 2nd stage estimations

1st stage coefficients are more than twice as high for # *Rel. Parishes*

- More potent instrument
- The relationship between # *Parishes* and the effectiveness of regional policy is enhanced by religiosity

2nd stage results are stronger than the OLS ones

- Suárez Serrato and Wingender; 2016; Auerbach et al., 2019: unaccounted for endogeneity leads to downwards bias in the estimation of returns to government expenditure

Conclusions & further research

Easily obtainable instruments in a field at the mercy of natural experiments, potential facilitator for future research

 # Parishes:

- Possibly generally applicable
- Care must be taken regarding decentralization

 # Rel. Parishes:

- May be replicable via country-specific local identity/voracity measures

Further research: Verify this for other countries

- If *# Parishes* and *# Rel. Parishes* do yield the same results
- If the positive link between the number of jurisdictions and government expenditure holds

Thank you/Q&A

Thank you for your time - I may now take your questions.

Baseline results (2)

Table A3: Baseline results (weighted by municipality population)

	$Y = \ln(Total\ GVA)$			$Y = \ln(Total\ Sales)$		
	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$	OLS	IV $\#\ Parishes$	IV $\#\ Rel.\ Parishes$
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(Total\ Curr\ Exp)$	1.373***	1.516***	1.480***	1.372***	1.540***	1.409***
	(0.086)	(0.119)	(0.145)	(0.091)	(0.116)	(0.146)
Obs.	277	277	277	278	278	278
$Adjusted\ R^2$	0.861	0.859	0.860	0.864	0.861	0.864
First-stage instrument		0.025***	0.068***		0.025***	0.068***
		(0.003)	(0.009)		(0.003)	(0.009)
First-stage F test		89.56	60.80		89.74	60.77
$\ln(Total\ Exp)$	1.340***	1.409***	1.467***	1.347***	1.432***	1.397***
	(0.086)	(0.112)	(0.140)	(0.090)	(0.108)	(0.140)
Obs.	277	277	277	278	278	278
$Adjusted\ R^2$	0.853	0.852	0.851	0.857	0.856	0.857
First-stage instrument		0.027***	0.069***		0.027***	0.069***
		(0.003)	(0.008)		(0.003)	(0.008)
First-stage F test		100.89	67.46		101.03	67.42
NUTS2	✓	✓	✓	✓	✓	✓
$Controls_{t-1}$	✓	✓	✓	✓	✓	✓
Inst.: $\#\ Parishes$		✓			✓	
Inst.: $\#\ Rel.\ Parishes$			✓			✓

NUTS2 (in their 2002 version) refers to the used geographical control variable - the Portuguese mainland regions (5 in number: Norte, Centro, Lisboa, Alentejo and Algarve). The reported IV estimations are weighted by municipality population. Standard errors in parentheses are clustered at the municipal level and are robust to heteroscedasticity. Stars indicate significance levels of 10% (*), 5% (**), and 1% (***).

Descriptive statistics: regional development

Table A4: Descriptive statistics, regional development

Variable	Observations	Mean	Std. Dev.	Min	Max
Full dataset					
$\ln(Total\ GVA)$	277	0.423	0.184	0	1
$\ln(Total\ Sales)$	278	0.404	0.188	0	1
Lisbon metropolitan area					
$\ln(Total\ GVA)$	18	0.697	0.133	0.492	1
$\ln(Total\ Sales)$	18	0.69	0.139	0.494	1
Porto metropolitan area					
$\ln(Total\ GVA)$	16	0.66	0.098	0.468	0.814
$\ln(Total\ Sales)$	16	0.648	0.102	0.44	0.799
Coastal municipalities					
$\ln(Total\ GVA)$	52	0.58	0.155	0.271	1
$\ln(Total\ Sales)$	52	0.562	0.159	0.225	1

This table presents descriptive statistics for the baseline timeframe, normalized to range from 0 to 1, for the full sample and the excluded municipalities in Tables 5 and 6.

Descriptive statistics: 2009-12 timeframe

Table A5: Descriptive statistics, 09-12 timeframe

Variable	Observations	Mean	Std. Dev.	Min	Max
Private Firm Performance (2011-12 averages)					
ln(*Total GVA*)	278	17.444	1.576	13.334	22.485
ln(*Total Sales*)	278	18.945	1.594	14.618	24.111
Municipal Expenditure (2009-10 averages)					
ln(*Total Curr Exp*)	278	9.337	0.814	7.944	13.021
ln(*Total Exp*)	278	9.757	0.785	8.359	13.269
Instruments (1999 values)					
# Parishes	278	14.522	12.772	1	89
# Rel. Parishes	278	2.259	3.293	0	30
Controls (2009-10 averages)					
Total Urban Area	278	11.387	14.796	0.334	91.279
Electricity Cons.	278	4274.38	4663.8	1569.905	60442.36
IMI	278	0.646	0.086	0.4	0.7
Industrial Area	278	0.014	0.023	0	0.15
Unemp. Rate	278	7.16	2.208	2.445	16.319
Highways	278	0.552	0.497	0	1
Tertiary Educ.	278	0.075	0.032	0.026	0.29
Pop. Density	278	0.311	0.836	0.005	7.154
Leftist Mandates	278	0.558	0.247	0	1
Mayor Majority	278	0.896	0.222	0	1
Business Tax Rate	278	0.008	0.007	0	0.015

This table presents descriptive statistics for Table 7's dataset - the 2009-2012 timeframe.