

NEW DIMENSIONS OF REGULATORY COMPLEXITY AND THEIR ECONOMIC COST.

AN ANALYSIS USING TEXT MINING

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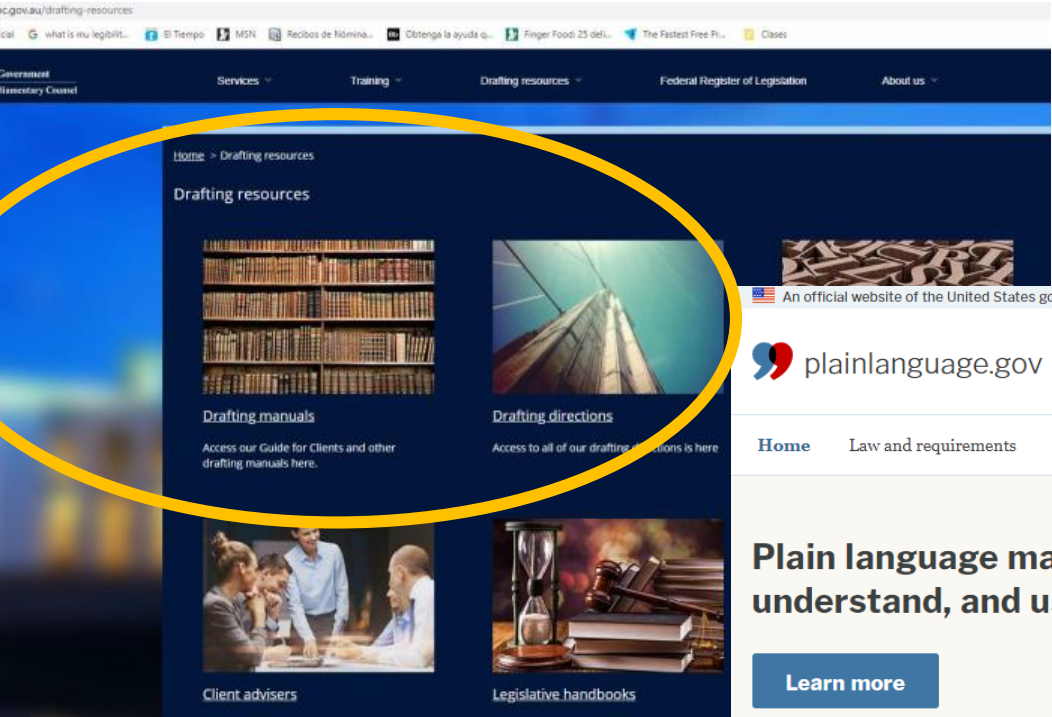
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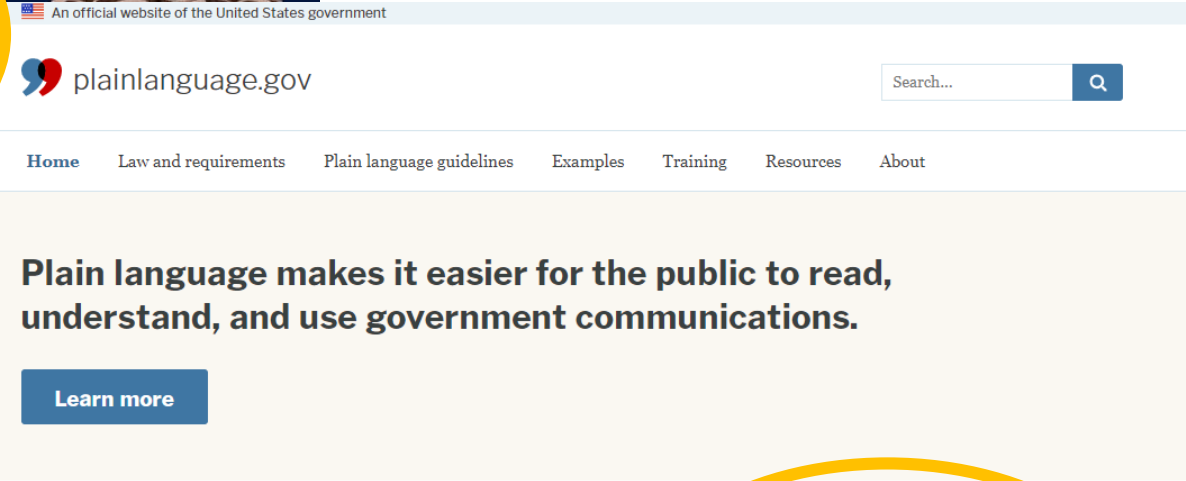
Introduction. Literature

- Regulation is fundamental to economic development. If well designed, it mitigates market failures. Regulation is a necessary but not sufficient condition to solve market failures.
 - Its effects are conditioned by transactional, administrative-political or informational reasons (Laffont and Tirole, 1993).
- Regulation may imply both direct and indirect economic costs.
 - Direct: resources devoted to compliance.
 - Indirect: changes in agents' behavior.
- Studies on the (negative) impact of regulation
 - Bailey and Thomas (2017), Coffey et al. (2020), Mora-Sanguinetti et al. (2024) -> lower number of firms, slower employment growth, growth
 - Palumbo et al. (2013) -> Higher litigation
- A main motivation for “better regulation” policies (Radaelli, 2007).

Regulatory complexity in some countries



Australia

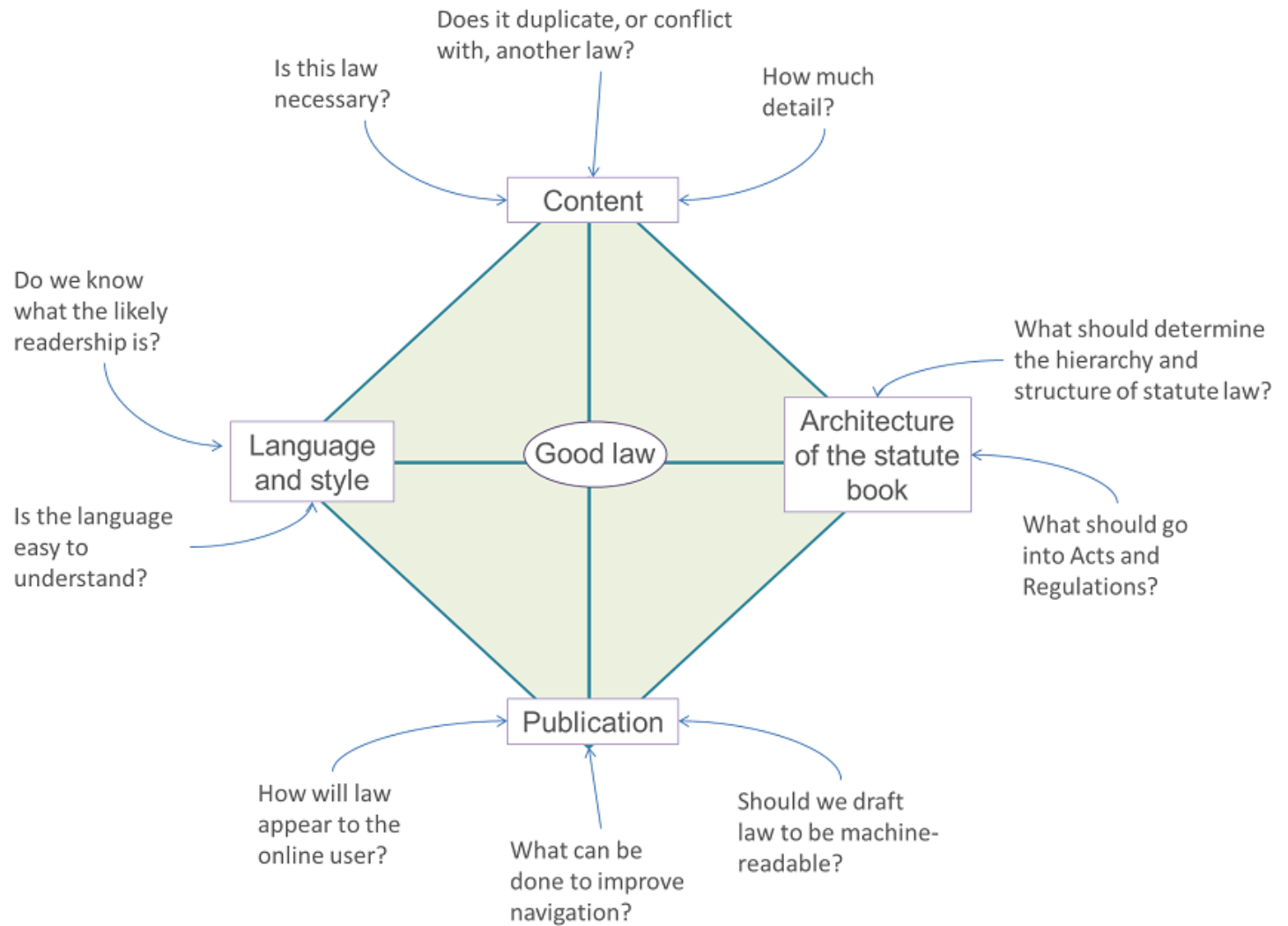


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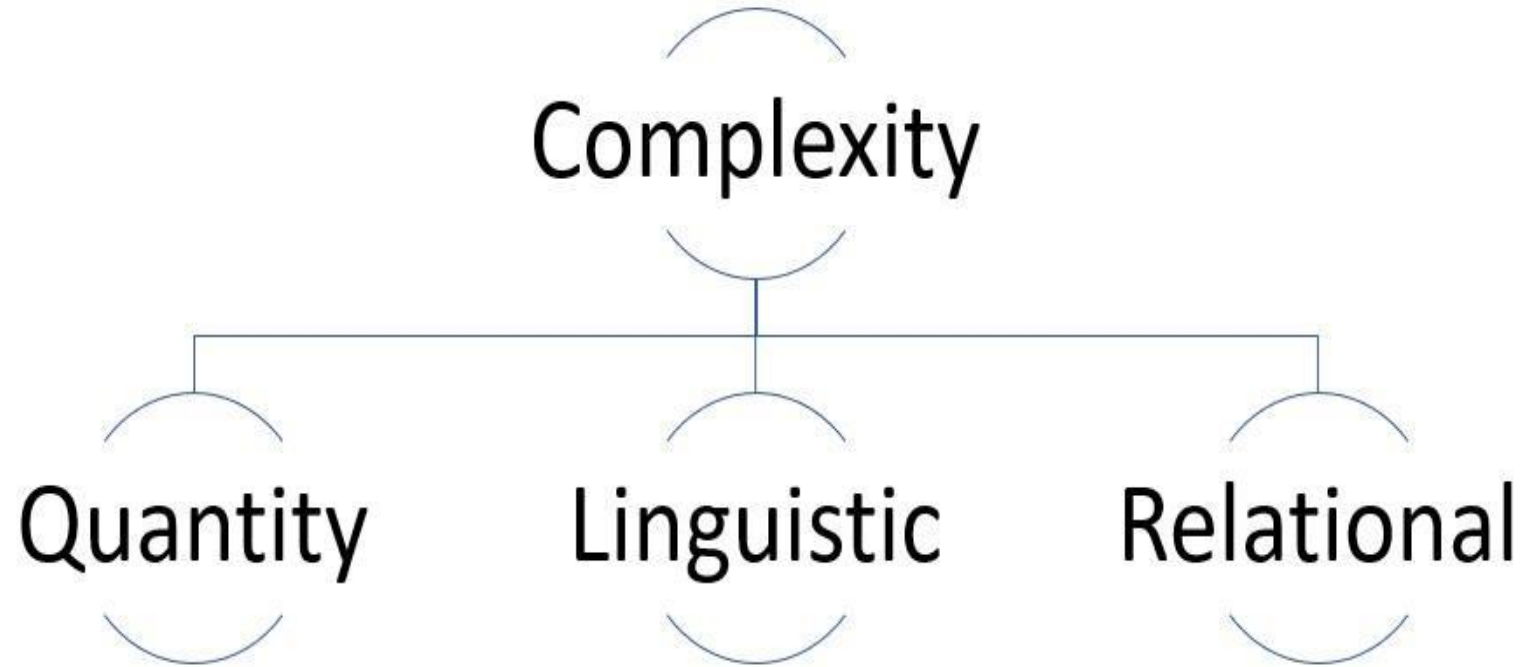
Regulatory complexity in some countries



Good Law principles

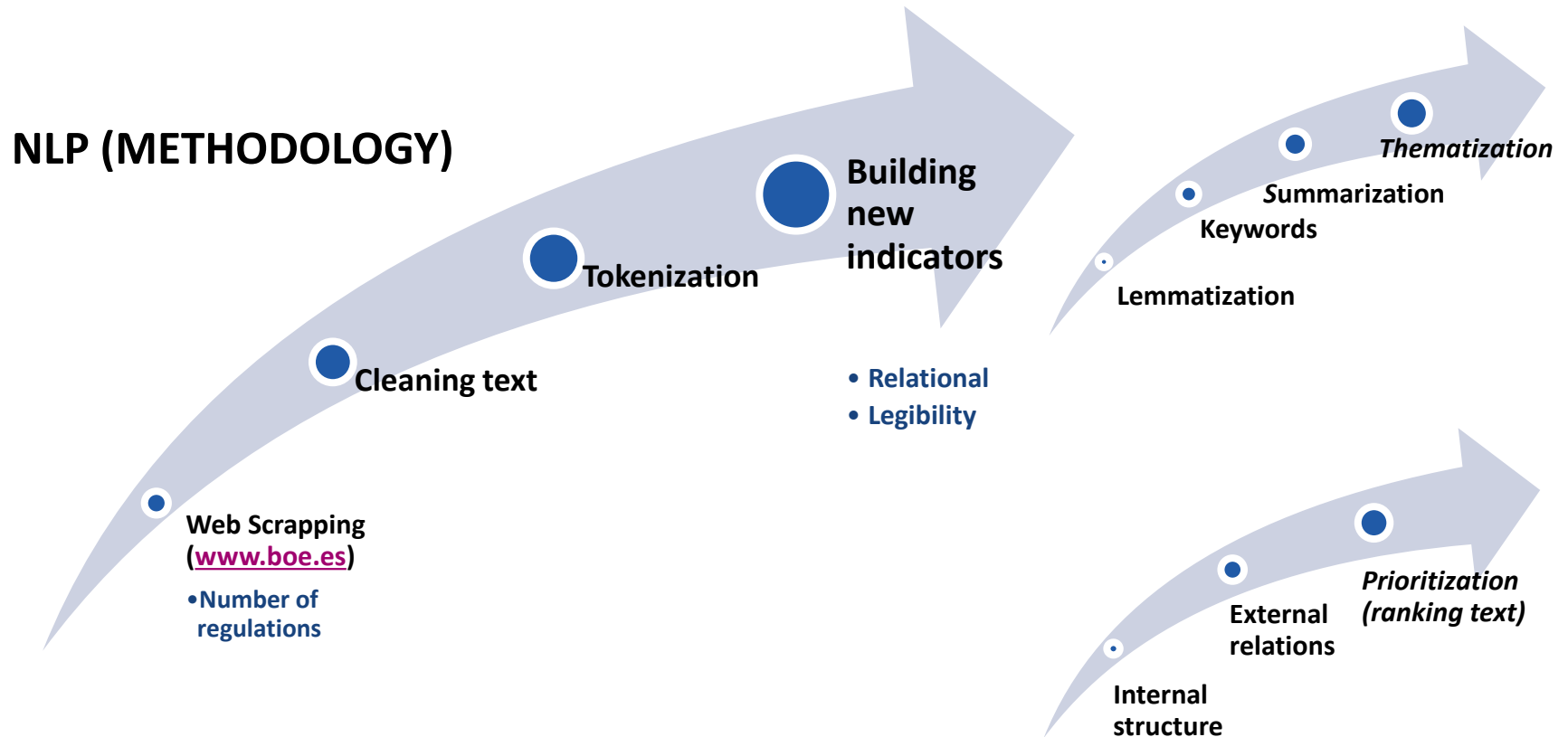
(United Kingdom)

(New) dimensions of regulatory complexity



(New) dimensions of regulatory complexity

- Our approach: use of NLP (natural language processing) to measure regulatory complexity (De Lucio and Mora-Sanguinetti, 2022).
 - Azqueta-Gavaldon et al. (2020), Ghirelli et al. (2019) and Baker et al. (2016) -> uncertainty; Hassan et al. 2019 -> political risk, etc.



New dataset

- We develop a new dataset: RECOS REgulation COmplexity in Spain database
 - Regional Laws and Decree-Laws (1978-2019): 8171 norms. 61 million words.
 - We develop new complexity indicators: linguistic, relational (+ volume)
- Previous database using NLP techniques with a similar purpose: US federal regulations. 1997-2012. Al-Ubaydli and McLaughlin (2017).
- Used by:
 - Davis (2017): related regulatory complexity and policy uncertainty
 - Chambers et al. (2019b): explored the link between regulation and prices,
 - Coffey et al. (2020): regulation and economic growth
 - Bailey and Thomas (2017): industry regulation and enterprise birth, employment growth

New dataset (volume)

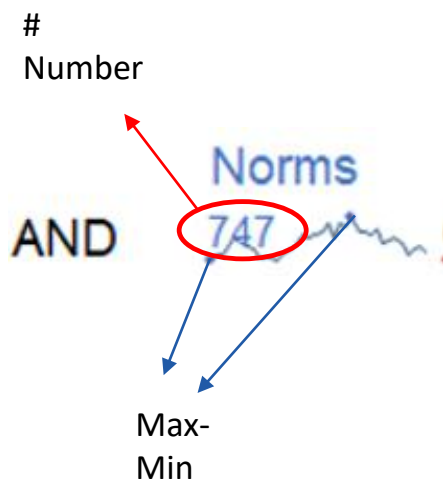
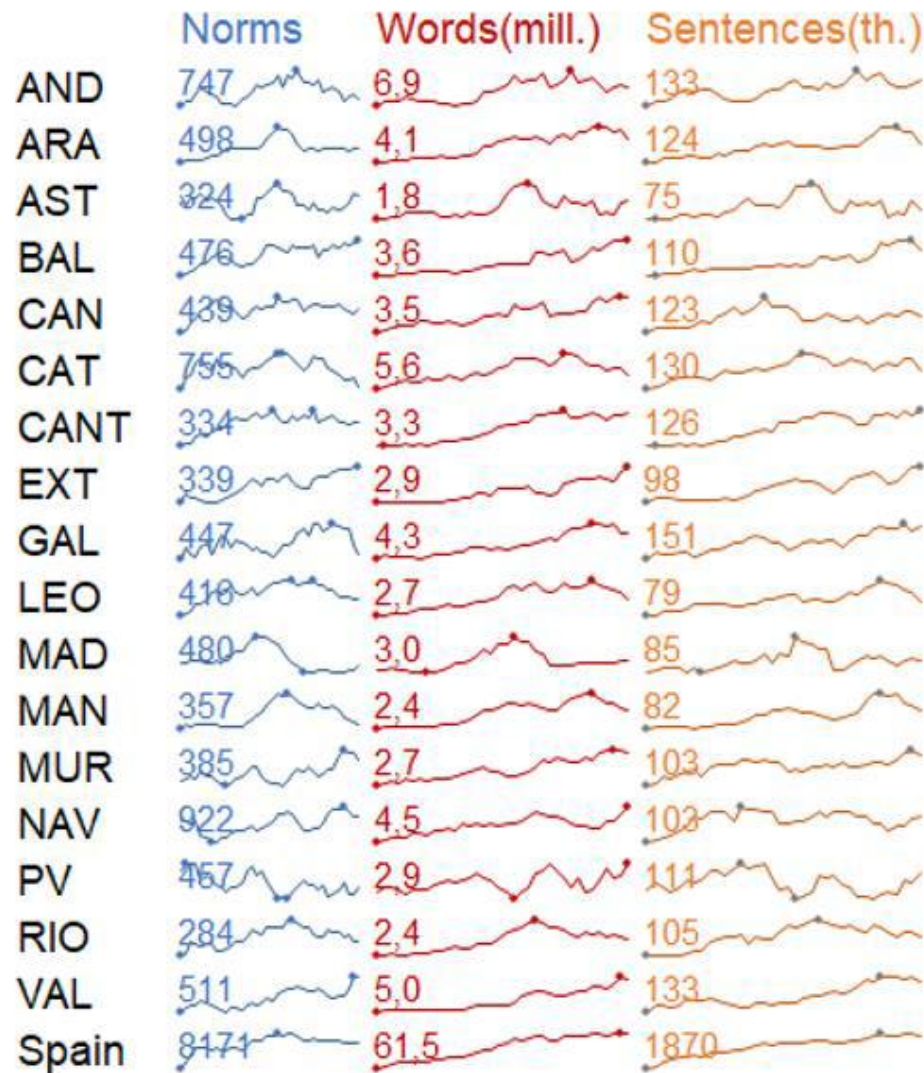


Figure 2: Basic volume indicators of the regional legal corpus



*"Spain" is the sum of all regional norms

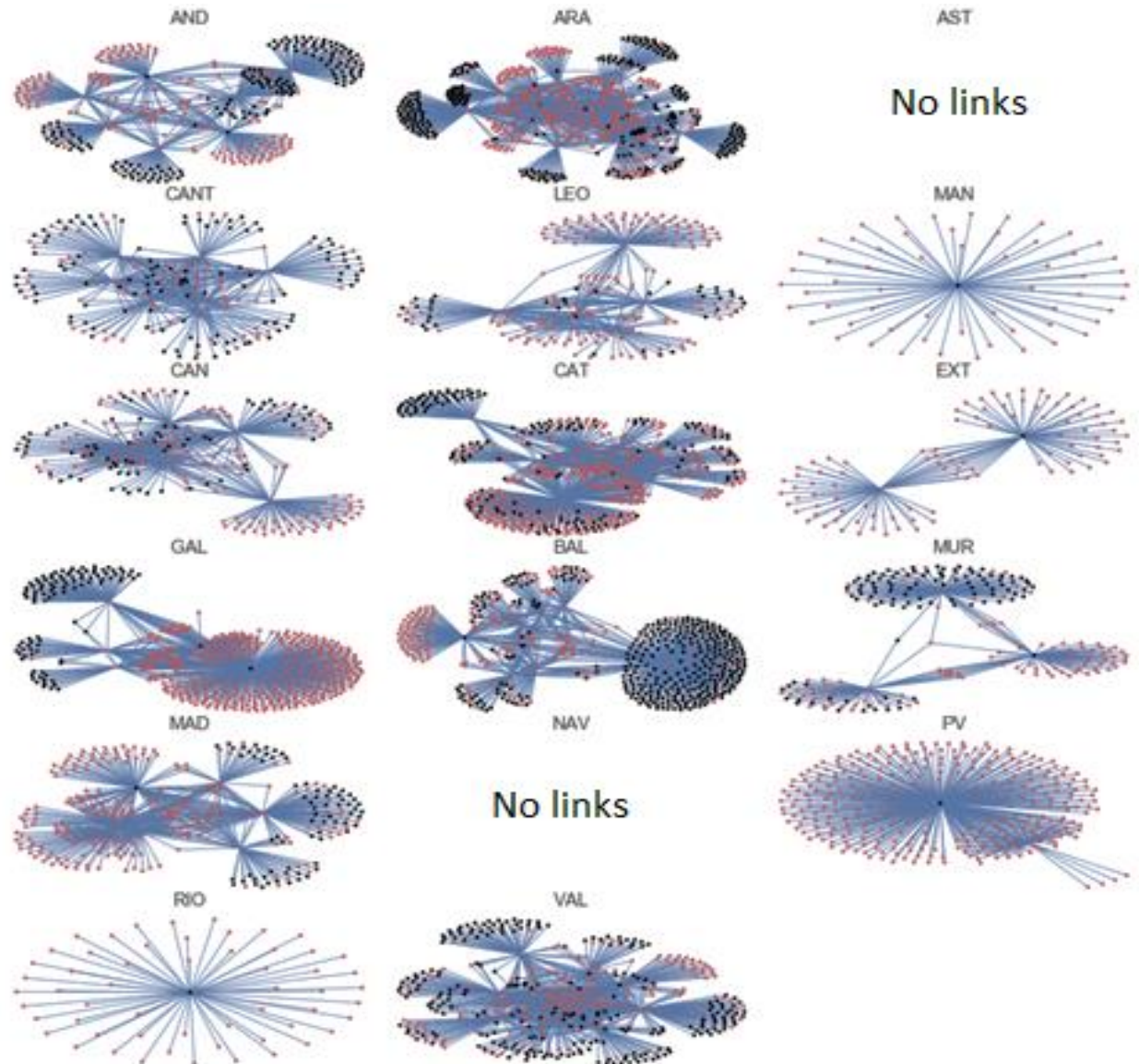
New dataset (network structure – relational perspective)

Regional network of norms (only for norms with more than 50 inward-outward links)

Red: regional regulations.

Black: other regulations

(Quantitative results in the next slide)



New measures (legibility)

LEGIBILITY

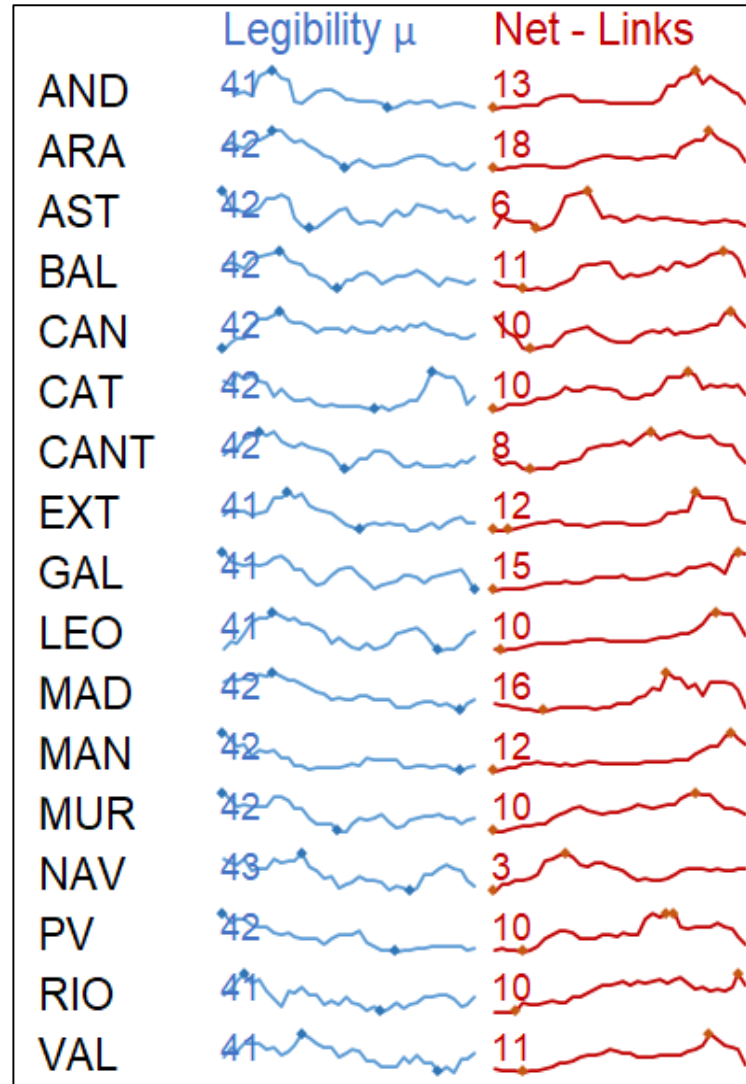
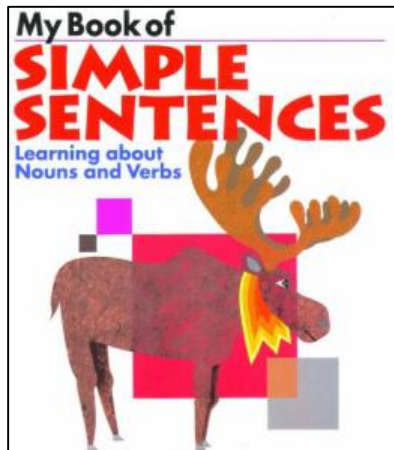
$$\mu_n = \left(\frac{W_{on}}{W_{on-1}} \right) \left(\frac{\overline{Le}_n}{\sigma_{Le_n}^2} \right) * 100$$

W: number of words

Le: Letters per word

Higher μ = higher readability

(Muñoz and Muñoz, 2006)



RELATIONAL STRUCTURE

$$\#Links_{reg,t} = \frac{\sum_{n \in (reg,t)} Links_n}{\sum_{n \in (reg,t)} n}$$

Links: average number of links incorporated in a norm

Denominator: number of norms adopted in a region

IMPACTS i (LABOUR PRODUCTIVITY)

- Impacts of complexity on labor productivity
 - Defined as value added (VA) per hour.
 - Source: De la Fuente (2019). Real VA per hour available for 1977-2017.
- Regions with more complex regulations are expected to experiment lower productivity. Within each region, periods with more complex regulations are expected to be negatively related to productivity.
 - Impact through “Total Factor Productivity” (TFP).
 - TFP growth (“technological progress”): impact of the quality of the institutional environment, such as the regulation of product and labor markets and the capacity of the economy to innovate on the productive use of labor, capital and other inputs (Scarpetta et al., 2002; Fuentes and Mora-Sanguinetti, 2012).

IMPACTS i (LABOUR PRODUCTIVITY)

- Panel data FE estimation covering regulation complexity of the 17 Spanish regions.
- Our dependent variable is productivity.
- Our estimates include regional (FE) and time fixed effects (TE).
- All variables enter the estimation in logs.
- Errors have been clustered at the regional level.

$$Prod_{reg,t} = Cte + \beta_1 \underbrace{\#Norms_{reg,t-i}}_{Quantity} + \beta_2 \underbrace{Legib_{reg,t-i}}_{Linguistic} + \beta_2 \underbrace{\#Links_{reg,t-i}}_{Relational} + \varepsilon_{reg,t}$$

Dimensions of complexity:

Quantity

Linguistic

Relational

IMPACTS i (LABOUR PRODUCTIVITY)

J. de Lucio and J.S Mora-Sanguinetti

Journal of Policy Modeling 44 (2022) 163–183

Table 1
Labor productivity per hour. Panel data Fixed effects.

	(1)	(2)	(3)	(4)	(5)
# Norms t	0.00232 (0.00158)				0.00181 (0.00150)
Legibility t		0.0769*** (0.0261)		0.0642** (0.0226)	0.0649** (0.0225)
# Links t			−0.00348* (0.00196)	−0.00257 (0.00186)	−0.00221 (0.00221)
Constant	0.551*** (0.146)	0.259 (0.196)	0.544*** (0.140)	0.309 (0.177)	0.315 (0.183)
Labor productivity $t-1$	0.947*** (0.0148)	0.948*** (0.0144)	0.949*** (0.0144)	0.948*** (0.0146)	0.947*** (0.0152)
Fixed effects					
Time	Yes	Yes	Yes	Yes	Yes
Regional	Yes	Yes	Yes	Yes	Yes
Observations	583	583	583	583	583
R-squared	0.985	0.985	0.985	0.985	0.985

Source: Own elaboration.

Robust (clustered) standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

IMPACTS ii (JUDICIAL EFFICACY)

J. de Lucio and J.S Mora-Sanguinetti

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Table 2
Judicial congestion (trial duration). Panel data Fixed effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	Civil (without family)			Total civil		
<i># Norms</i> $t-1$	-0.00619 (0.0161)			-0.00833 (0.0146)		
<i>Legibility</i> $t-1$		-0.126 (0.246)			-0.0696 (0.229)	
<i># Links</i> $t,1$			0.0232* (0.0110)			0.0212** (0.00996)
<i>Judicial Cong.</i> $t-1$	0.690*** (0.0556)	0.689*** (0.0550)	0.684*** (0.0563)	0.699*** (0.0564)	0.699*** (0.0557)	0.694*** (0.0569)
<i>Constant</i>	6.820 (6.490)	7.327 (6.536)	7.076 (6.344)	7.003 (6.007)	7.282 (6.115)	7.246 (5.877)
<i>Fixed effects</i>						
<i>Time</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Regional</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Controls (lawyers, productivity)</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Observations</i>	272	272	255	255	255	255
<i>R-squared</i>	0.807	0.807	0.810	0.783	0.783	0.786

Source: Own elaboration.

Robust (clustered) standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Concluding remarks

- We constructed a new database (RECOS, Regulation Complexity in Spain)
- We also build a set of indicators covering the new dimensions of complexity: legibility and network structure.
- This research provides a first exploration of the effects of the new dimensions of complexity on labor productivity growth and judicial efficacy.
- Our research rationalizes the efforts of public administrations to achieve “better regulation”.

**THANK YOU FOR YOUR ATTENTION
MERCİ DE VOTRE ATTENTION**

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