

# **The economics of business regulations in agriculture: concepts and empirical evidence**



**WORLD BANK GROUP**

**Federica Saliola**  
**IAMO Forum 2017**  
**Eurasian Food Economy**

**June 22, 2017**

# Main concepts

- Business regulations concepts
- Role of business regulation in determining economic performance in agriculture?
- How to measure business regulations for agriculture?
- New empirical evidence

# Agriculture for development

An aerial photograph of a lush green landscape. The terrain is characterized by rolling hills and a winding river that flows through the center. The fields are vibrant green, and there are some trees on the left side of the image. The overall scene is peaceful and scenic.

**How did the economic thinking around the role of agriculture for development evolve since the 1950's?**

# Agriculture for development/2



Classical economists viewed development as the shift from a traditional AG sector to a more productive, modern industrial sector (Lewis, 1954)

AG as a driver of growth in the early stages of industrialization. Growth linkages and multiplier effects make AG important for broader economic development (Johnson and Mellor, 1961)

MDGs shifted the debate from growth “per se” to “shared”. Multiple development functions of AG: triggering growth, reducing poverty and inequality, providing food security, and delivering environmental services (Byerlee, De Janvry and Sautolet 2009)

# Rural transformation

An aerial photograph of a rural landscape. A winding river flows through the center of the frame, surrounded by lush green fields. The background shows rolling hills under a clear sky. The overall scene is vibrant and depicts a typical rural environment.

## Structural change

As they develop, countries reallocate their economic activities away from agriculture. The share of manufacturing and services over GDP increases (Timmer, 2009).

## Rural transformation

Shift towards cash crops and high-value/high-risk varieties, increased integration with the rest of the economy (Divanbeigi, Paustian and Loayza, 2016).

Since 2000 agriculture contributed to over 60% of employment and over 30% of GDP in low income countries.

Agriculture keeps growing in absolute terms. Rural transformation promotes inclusive structural change by containing the rural-urban gap.

# Business regulations

**Sets of rules that constrain the actions of economic agents with the objective of achieving social goals (e.g. safety, job security, health).**

## Rationale

Justified by structural market failures arising from informational asymmetries, economies of scale, fragmented markets, and externalities. In their presence, agents don't internalize the social costs/benefits of their actions, and therefore adequate regulation can raise social welfare (Pigou 1938).

## Political economy

Industry incumbents can acquire regulations that create rents for themselves (Stigler 1971; Tullock 1967). Politicians/bureaucrats use regulation to extract rents through campaign contributions, votes, and bribes (De Soto 1990; McChensney 1987; Shleifer and Vishny 1993).

# Regulation and economic performance: Transmission channels

## **Informality**

Excessive regulation – e.g. high business registration costs – can push firms to the informal sector (Bruhn, 2011; Branstetter et al., 2014). High business-entry costs reduce firm output and productivity (Barseghyan, 2008).

## **Uncertainty**

Effective judicial courts, bankruptcy and investor protection laws mitigate risk allowing easier contract enforcement and higher debt recovery rates (Visaria, 2009).

## **Transaction costs**

Burdensome import and export regulations decrease trade volumes (Djankov, Freund and Pham, 2010; Hoekman and Nicita, 2011).

Overly-strict financial regulations limit access to financial services and disproportionately penalize SMEs (Love, Martinez-Peria and Singh, 2016).

# Business regulation in agriculture

Business regulations have been neglected. Few existing studies focus on limited samples and narrow areas

- Agricultural input markets in Bangladesh (Ahmed, 1995)
- Seed and Machinery markets in Bangladesh, Turkey (Gisselquist and Grether, 2000)
- Fertilizer market in Kenya (Freeman and Kaguongo, 2003)
- Fertilizer market in Ethiopia (Spielman, 2011)

Nonetheless, what we know from the existing literature clearly points at the need to do further research



# Externalities

Externalities are prevalent in agriculture and imply more pervasive business regulations (Diaz-Bonilla, 2014)

- Sanitary and Phytosanitary Standards
- Food safety
- Fertilizer and Seed quality
- Groundwater extraction
- Environmental protection

# Transmission channels

The transmission channels identified by the economic literature are even more relevant in Agriculture.

## **Informality**

Less complex processes make legal protection and contract enforcement less valuable. Firms more sensitive to regulatory costs stay informal (Loayza, Servén and Sugawara, 2009).

## **Uncertainty**

Susceptibility to exogenous elements such as weather, insects, diseases. Intermediate production phases unobservable due to biological processes, limiting corrective actions before harvest. Production decisions made before knowing market price of crops (Aimin, 2010).

## **Transaction costs**

1/3 of farm gate price in SSA (World Bank, 2007). Prevent farmers from specializing in the goods where they have a competitive advantage (Gollin and Rogerson, 2010). High marketing costs discourage farmers' market participation (Gebremedhin and Jaleta, 2012).

# Measurements

An aerial photograph of a lush green agricultural landscape. A winding river or canal cuts through the fields, which are marked with circular patterns from farming equipment. A single tree stands on the left side of the frame. The background shows rolling hills under a clear sky.

Enabling regulatory environment for agriculture: how can we measure it?

What are the key elements for a successful business environment for agriculture?

Competition, sustainability and food security are important concepts – let's find the right balance!

# Enabling the Business of Agriculture (EBA)

New data that benchmarks business regulations and regulatory transaction costs that are particularly relevant for agribusinesses.

Indicators are designed to capture regulatory systems that ensure the safety and quality of agricultural goods and services without being costly or burdensome

62 economies worldwide, standardized through case-studies, survey-based

# Quality and Efficiency indicators

**Quality indicators** measure conformity with regulatory good practices aimed at correcting market failures.

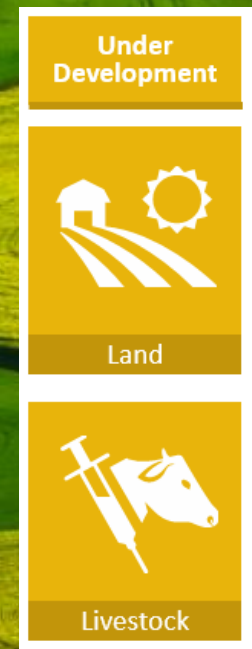
*Requirements on registration, labeling and monitoring of new fertilizers ensure that farmers have full information on the fertilizer they plan to use on their crops and protect them from purchasing low-quality products. Inadequate nutrients, heavy metals or other residues found in fertilizer products can contaminate crops, animals and humans (Sartain et al., 2004).*

**Efficiency indicators** measure **transaction costs** of regulatory compliance on the ground.

*Regulatory bottlenecks exporting agricultural products – such as special licenses, registration and export documentation – can discourage private investment in marketing and storage capacity (World Bank, 2012; Pannhausen and Untied, 2010). Delays in obtaining mandatory export documents can reduce overall export volumes due to damage or deterioration, especially for time-sensitive agricultural products (Djankov, Freund and Pham, 2010).*

# Key regulatory elements along the value chain

Need to benchmark **markets and processes** associated with activities along the **agribusiness value chain**



# Key regulatory elements along the value chain/2

	"LEGAL" INDICATORS	"EFFICIENCY" INDICATORS
<b>SEED</b>	<ul style="list-style-type: none"> <li>&gt; Plant breeding</li> <li>&gt; Variety registration</li> <li>&gt; Seed quality control</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Time and cost to register new varieties</li> </ul>
<b>FERTILIZER</b>	<ul style="list-style-type: none"> <li>&gt; Fertilizer registration</li> <li>&gt; Quality control of fertilizer</li> <li>&gt; Importing and distributing fertilizer</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Time and cost to register a new fertilizer product</li> </ul>
<b>MACHINERY</b>	<ul style="list-style-type: none"> <li>&gt; Tractor operation</li> <li>&gt; Tractor testing and standards</li> <li>&gt; Tractor import</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Time and cost to obtain type approval</li> <li>&gt; Time and cost to register a tractor</li> </ul>
<b>FINANCE</b>	<ul style="list-style-type: none"> <li>&gt; Branchless banking</li> <li>&gt; Movable collateral</li> <li>&gt; Non-bank lending institutions</li> </ul>	
<b>MARKETS</b>	<ul style="list-style-type: none"> <li>&gt; Producer organizations</li> <li>&gt; Plant protection</li> <li>&gt; Agricultural trade</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Documents, time and cost to export agricultural goods</li> </ul>
<b>TRANSPORT</b>	<ul style="list-style-type: none"> <li>&gt; Trucking licenses and operations</li> <li>&gt; Cross-border transportation</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Time and cost to obtain trucking licenses</li> <li>&gt; Time and cost to obtain cross-border licenses</li> </ul>
<b>WATER</b>	<ul style="list-style-type: none"> <li>&gt; Integrated water resource management</li> <li>&gt; Individual water use for irrigation</li> </ul>	
<b>ICT</b>	<ul style="list-style-type: none"> <li>&gt; Information and communication technology</li> </ul>	

# Key regulatory elements along the value chain/2

<b>LAND</b>	<p><i>(pilot scoring for 38 countries)</i></p> <ul style="list-style-type: none"><li>&gt; Coverage and relevance of land records</li><li>&gt; Public land management</li><li>&gt; Gender disaggregation of land records</li><li>&gt; Leasing of land between private parties</li><li>&gt; Procedural safeguards in case of expropriation</li></ul>
<b>LIVESTOCK</b>	<p><i>(not scored)</i></p> <ul style="list-style-type: none"><li>&gt; Requirements to register veterinary medicinal products</li><li>&gt; Requirements for importing veterinary medicinal products</li><li>&gt; Requirements for labeling of veterinary medicinal products</li></ul>
<b>ENVIRONMENTAL SUSTAINABILITY</b>	<p><i>(not scored)</i></p> <ul style="list-style-type: none"><li>&gt; Conservation of plant genetic resources</li><li>&gt; Access and sustainable use of plant genetic resources</li><li>&gt; Water quality management</li><li>&gt; Soil health management</li></ul>
<b>GENDER</b>	<p><i>(not scored)</i></p> <ul style="list-style-type: none"><li>&gt; Availability of gender-disaggregated data</li><li>&gt; Restrictions on women's employment and activity</li><li>&gt; Women's participation and leadership in collective institutions</li><li>&gt; Non-discrimination provisions</li></ul>

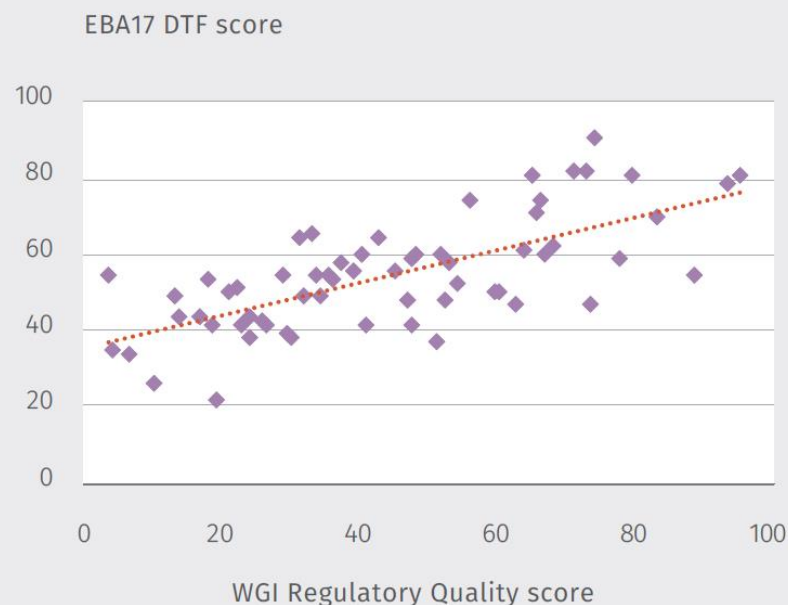
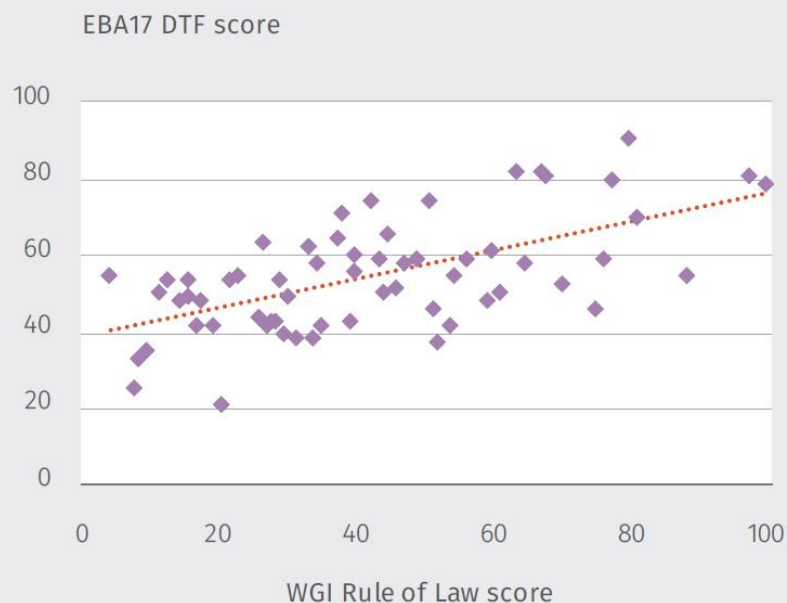


# Key regulatory elements along the value chain/2

Economy	Seed Ranking	Plant breeding index (0-10)	Variety registration index (0-8)	Seed quality control index (0-12)	Time to register new variety (days)	Cost to register new variety (% income per capita)
Armenia	28	8.0	6.5	2.0	587	18.5
<b>Bosnia-Herzeg.</b>	56	7.0	2.0	4.0	<b>No practice</b>	<b>No practice</b>
Georgia	13	9.0	7.0	4.0	581	0.0
Kazakhstan	35	10.0	6.5	4.0	No practice	No practice
<b>Kyrgyz Republic</b>	<b>53</b>	<b>7.0</b>	<b>4.0</b>	<b>2.0</b>	<b>970</b>	<b>219.4</b>
<b>Romania</b>	<b>6</b>	<b>10.0</b>	<b>5.5</b>	<b>11.0</b>	<b>654</b>	<b>23.2</b>
Russian Federation	18	9.0	7.0	4.0	716	0.0
Serbia	19	8.0	5.0	7.0	604	0.4
Tajikistan	51	8.0	4.5	4.0	No practice	No practice
Turkey	12	6.0	6.5	10.0	646	28.8
Ukraine	33	8.0	5.0	3.0	714	25.4

# EBA and Other Measures of Regulatory Quality

Higher EBA scores are associated with better performance in other measures of regulatory quality, including World Governance Indicators

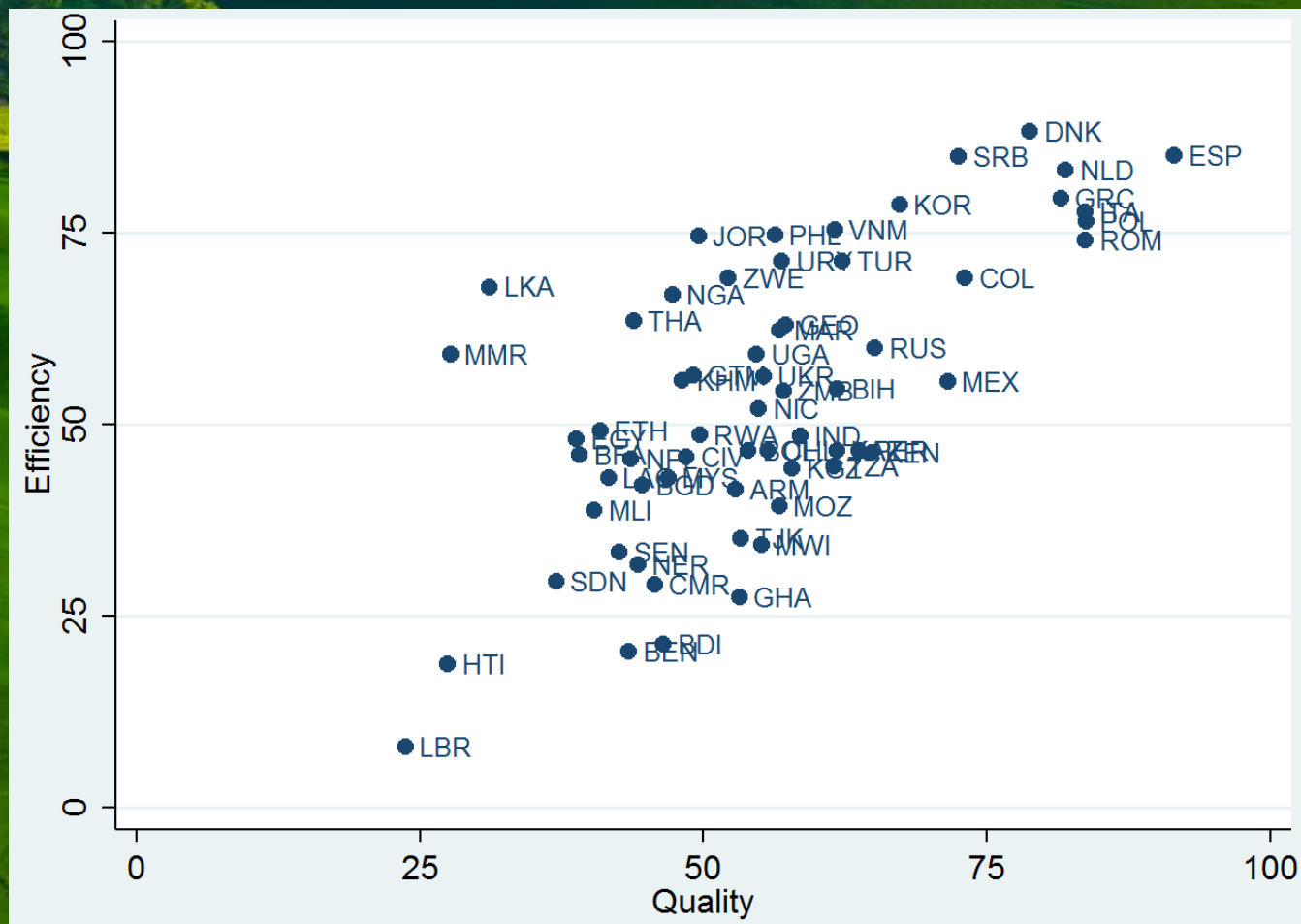


Sources: EBA database; Worldwide Governance Indicators.

Note: The correlation between the EBA17 distance-to-frontier (DTF) score and the rule of law score is 0.61. The correlation is significant at a 5% level after controlling for income per capita. The correlation between the EBA17 DTF score and the regulatory quality score is 0.70. The correlation is significant at a 1% level after controlling for income per capita. The EBA17 DTF score is the average of the DTF scores of the following topics: seed, fertilizer, machinery, finance, markets, transport, water and information and communication technology.

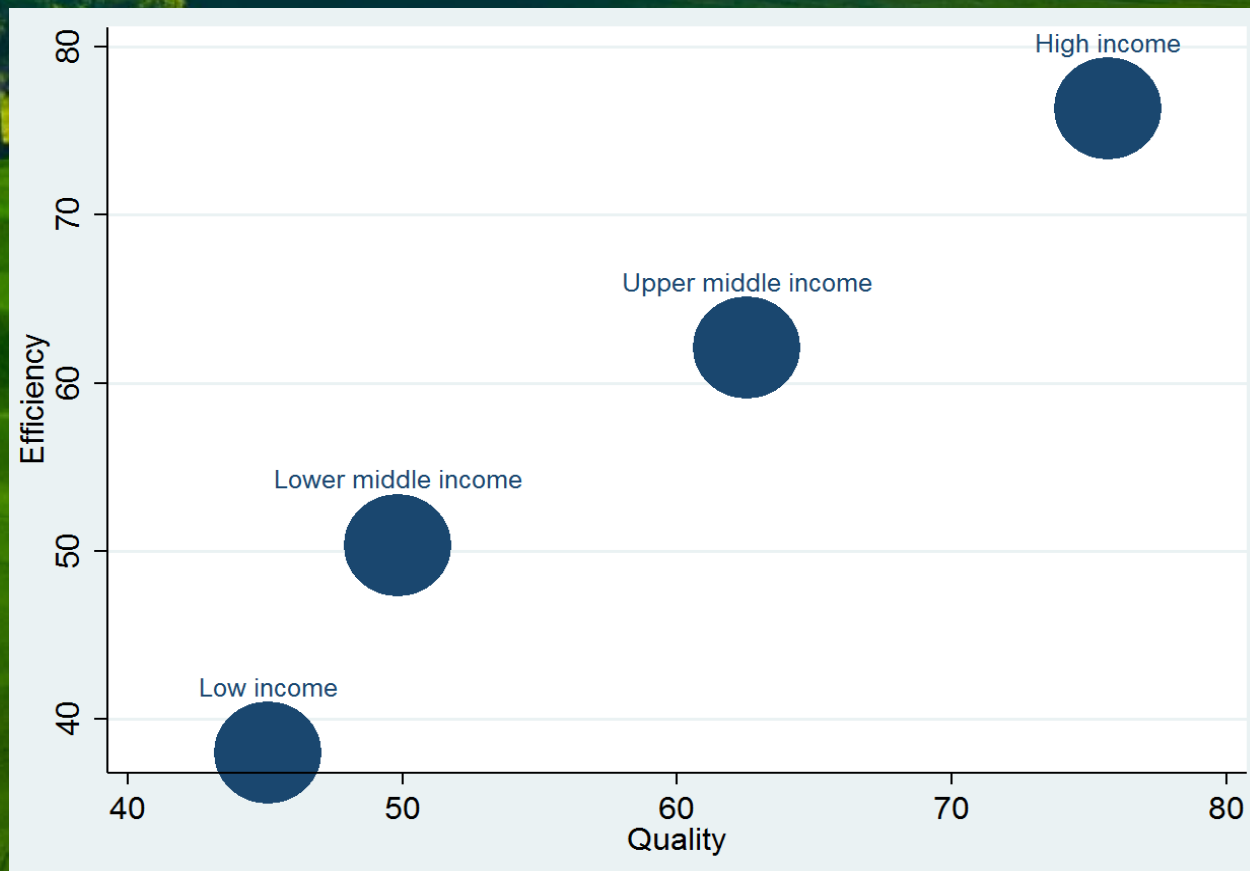
# Quality VS Efficiency indicators

Regulatory Quality and Efficiency often go hand in hand



# Quality VS Efficiency indicators/3

Both Quality and Efficiency scores increase with income levels.



# Aggregate agricultural production function

Following the approach of Lio and Liu (2008), we estimate country  $i$ 's aggregate agricultural production function as:

$$\ln AGVA_i = \alpha_0 + \alpha_1 REGULATION_i + \alpha_2 INPUTS_i + \alpha_3 CountryControls_i + \alpha_3 Region_i + \varepsilon_i \quad (3)$$

(Divanbeigi, Saliola, 2017)

# Aggregate agricultural production function/2

VARIABLES	Dependent Variable: lnAGVA				
	OLS	OLS2	OLS3	OLS4	2SLS
lnEBA		1.064** (0.397)			4.343*** (1.421)
lnEBAEFF			0.676** (0.260)		
lnEBAQUAL				0.973** (0.456)	
lnLABOR	0.273*** (0.0560)	0.226* (0.133)	0.220 (0.134)	0.232* (0.125)	0.216 (0.196)
lnLAND	0.498*** (0.0701)	0.505*** (0.130)	0.508*** (0.135)	0.518*** (0.128)	0.407** (0.165)
LIVESTOCK	6.53e-09*** (2.14e-09)	4.81e-09* (2.60e-09)	5.46e-09** (2.59e-09)	3.78e-09 (2.83e-09)	5.31e-09* (3.04e-09)
EDUCATION	1.093*** (0.281)	0.723* (0.375)	0.792** (0.373)	0.768* (0.393)	0.0582 (0.608)
RAIN	0.000226* (0.000127)	0.000239 (0.000271)	0.000245 (0.000282)	0.000165 (0.000270)	0.000673 (0.000435)
LANDLOCK	-0.354** (0.163)	-0.592** (0.243)	-0.617** (0.241)	-0.621** (0.249)	-0.310 (0.327)
Constant	7.486*** (1.530)	5.452* (3.003)	6.565** (2.843)	5.621* (2.941)	-3.422 (5.267)
Observations	140	59	59	59	59
Adjusted R <sup>2</sup>	0.860	0.723	0.721	0.712	0.411

# Aggregate agricultural production function/3

- Better agricultural regulation is associated with higher agricultural productivity
- Overall measure of regulatory quality: a country with better agricultural regulations produces on average more agricultural output with the same amounts of agricultural inputs.
- Efficiency and quality measures: : lower regulatory transaction costs and a higher number of regulatory good practices are associated with higher average agricultural productivity.
- Quality and efficiency features display a stronger association with agricultural productivity when they are combined.
- The effect of more business-friendly regulation on agricultural productivity remains positive and significant when instrumenting business regulations with countries legal origin

# Conclusions

- The interest on the role of institutions such as governance and regulations on economic development has recently increased
- The relationship between regulation and agriculture is far less explored by the literature although the transmission channels identified for manufacturing are even more relevant in agriculture
- Economic research is key in guiding evidence-based policymaking towards more effective regulations – more data and analysis are needed!
- Based on new measures and analysis of regulatory quality and efficiency in agriculture we find that agricultural productivity is higher where transaction costs imposed by regulations are lower and where countries adhere to a higher number of regulatory good practices



THANK YOU



**WORLD BANK GROUP**