Social progress and informal economy: a worldwide empirical evidence

Tiziana Medda – *University of Turin*

Flaviana Palmisano – *Sapienza University of Rome*

Agnese Sacchi – *Sapienza University of Rome*

XXI AISSEC Conference "COMPARATIVE PERSPECTIVES ON ECONOMIC DEVELOPMENT AND INEQUALITIES"

OUTLINE

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- **Research question & contribution**
- **Testable hypotheses**
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- **Results & discussion**
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MOTIVATION (1/2)

- **Social progress has increased in the last 30 years around the world** → *countries with higher social progress experience better and higher education, increased access to service, reduced rates of poverty and increased people's participation in political and public life* (UNDP 2016).

- **Social progress** could also **deter individuals** form carrying out **activities** that can **hamper economic development** → all the activities that fall within the realm of **informal economy** and that are considered a public damage or that can generate negative externalities.

- **Social progress** should also act by **increasing the opportunity costs of turning to the informal sector** to find a job or to provide goods and services.
  - This would enlarge the employment opportunities available in the formal sector.

MOTIVATION (2/2)

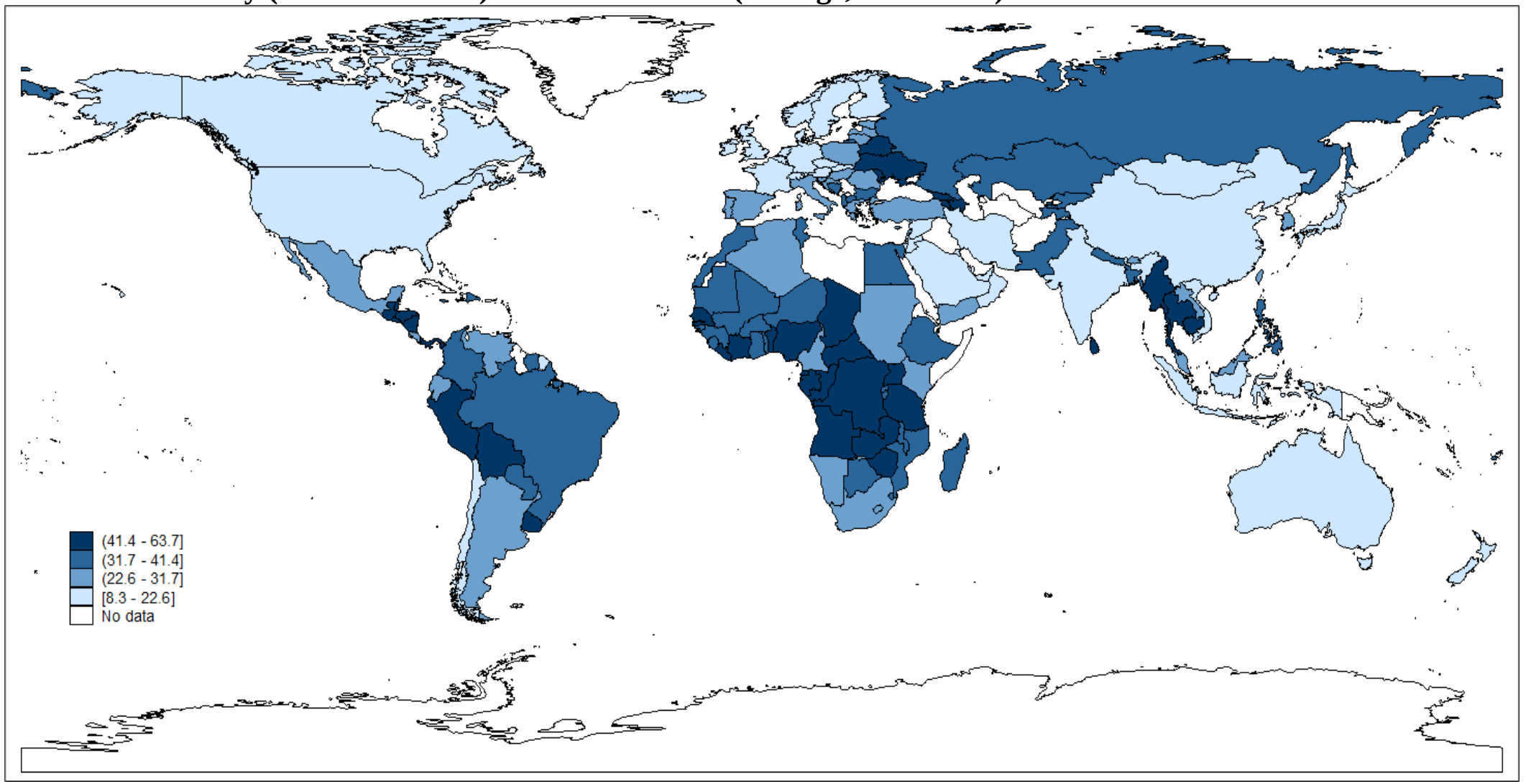
- This poses the question of whether **social progress** can be considered as a **strategic ingredient to reduce** the size of **informal economy** (**IE**), whose consequences represent a crucial issue for development in both developed and developing countries.

- This question has been **partially neglected by the literature**, which mostly focused on economic, fiscal and institutional aspects as the main drivers of IE.

- The **economic literature on IE** has been very prolific, especially in the last two decades, according to **three main categories:**
  i. works aimed at developing alternative methodologies to estimate IE.
  ii. works mainly concerned with the consequences of IE.
  iii. works that shed light on the determinants of IE.

Some data on IE

Informal economy (% official GDP) around the world (average, 1990-2016)



Source: Authors' elaborations on Elgin and Oztunali (2012).

RESEARCH QUESTION & CONTRIBUTION

- The present study falls within the last group of contributions → **we aim at investigating the role of social progress**, which by definition **encompasses economic, fiscal and cultural aspects**, as a **specific determinant of IE**.

- Our paper **contributes** to the existing literature in different ways.
  - ✓ We consider **156 countries around the world observed over years 1990-2016**, including the recent Great Recession (previous studies have employed smaller samples and shorter time span, e.g., Dell'Anno 2010; Ruge 2010; Kelmanson et al. 2019).
  - ✓ As **social progress** is a **multidimensional phenomenon**, we exploit the **informational power** of the **HDI**, as a proxy for social progress, by studying the impact of the **each HDI component** (*health, education, income*) **on IE.**
  - ✓ We provide an analysis for **sub-groups of countries** in order to **increase cross-country comparability** and, likewise, **explore** whether any **differences** in the investigated relationship arise between such sub-groups.

HDI as a measure of social progress

- **Traditionally**, and due to data availability, economists have measured country's **social progress** looking at the evolution of popular statistics such as the **GDP. But,** monetary aggregate would **fail to capture** the whole set of dimensions that shape **individuals' well-being** (Sen 1980, 1985).

- We use the **Human Development Index (*HDI*)** → it reflects "*the development of the people through building human capabilities, for the people by improving their lives and by the people through active participation in the processes that shape their lives*" (UNDP 2016).

- Its strength also relies on the possibility of collecting information for a **large number of countries and over a long-time horizon.**

- The three components of the *HDI* - **health, education, and income** - reflects three of the 20 Sustainable Development Goals that 195 countries have agreed to reach by 2030 and by the Sen-Stiglitz-Fitoussi commission (Stiglitz et al. 2009).

TESTABLE HYPOTHESES

- **H1: social progress would contribute to shrink IE**
  - ✓ It favours transparency and accountability within society.
  - ✓ It could reduce the incentives of operating in the informal sector.

- **H2: possible non-linear relationship between social progress and IE**
  - ✓ The size of IE can be considerable at different levels of social progress → i.e. *at high level of social progress, a further increase might not lead to lower IE.*

- **H3: possible heterogenous effects of single components of social progress (*HDI*) on IE**
  - ✓ Factors at work: *job opportunities; productivity gap; opportunity costs; increased competences; better allocation of resources; tools to tackle illegal activities*.

THE EMPIRICAL ANALYSIS

- The **baseline model** we estimated is the following:

$$IE_{i,t} = \alpha + \beta HDI_{i,t-1} + \gamma \boldsymbol{X_{i,t-1}} + \mu_i + \tau_t + \varepsilon_{i,t}$$

- ***i* = 1, …, 156; *t* = 1990-2016** (with some gaps)

- $\boldsymbol{IE_{i,t}}$ = **time-varying estimates of the size of informal economy, % official GDP** (Elgin & Oztunali 2012)
  - *Generated by using a new methodology based on a two-sector (official and the shadow economies) dynamic general equilibrium model, which is then calibrated to match various observable macroeconomic variables and finally used to back out the unobservable size of IE.*

- $\boldsymbol{HDI_{i,t-1}}$ = **arithmetic (and geometric, since 2010) mean of key dimensions of human development: *health, education, income*** (UNDP 1990).

- $\boldsymbol{X_{i,t-1}}$ = *dependency ratio, female population, population density, trade, rule of law, active participation, self-employment.*

MAIN RESULTS

	Dep. variable: *IE*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.HDI	-0.441***	-0.425***	-0.431***	-0.424***	-0.424***	-0.374***	-0.364***	-0.252***
	(0.017)	(0.018)	(0.018)	(0.018)	(0.017)	(0.021)	(0.023)	(0.032)
L.Dependency ratio		0.024***	0.022***	0.029***	0.015**	0.034***	0.037***	0.117***
		(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.015)
L.Population density			0.011***	0.010***	0.011***	0.015***	0.015***	0.115*
			(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.064)
L.Female population				-0.217***	-0.130**	-0.093*	-0.070	-0.225
				(0.054)	(0.055)	(0.054)	(0.060)	(0.196)
L.Trade					0.000	0.001	0.001	-0.004
					(0.002)	(0.002)	(0.002)	(0.003)
L.Rule law						-0.007***	-0.007***	-0.004
						(0.002)	(0.002)	(0.002)
L.Active participation							-0.021***	-0.001
							(0.008)	(0.012)
L.Self-employed								0.077***
								(0.016)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N observations	3,803	3,740	3,720	3,720	3,613	2,924	2,745	740
N countries	156	155	155	155	155	155	145	47
R^2 within	0.508	0.508	0.510	0.512	0.539	0.542	0.539	0.651
p > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. The constant is included but not reported in the table. From columns (6) to (8) data are available from 1997 to 2016.

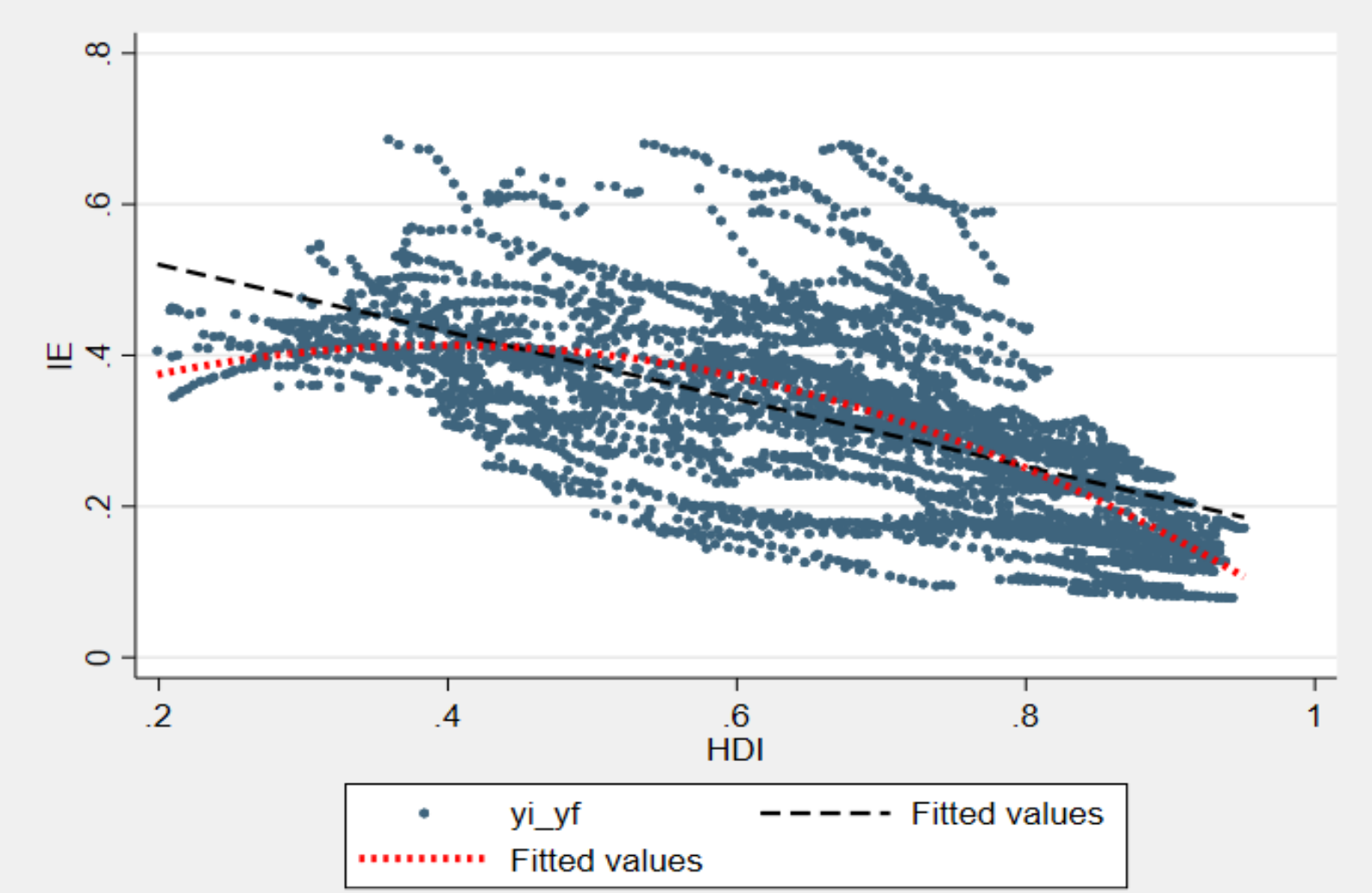
Testing for non-linearities (1/2)

	Dep. variable: *IE*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.HDI	-0.639***	-0.609***	-0.603***	-0.594***	-0.536***	-0.549***	-0.533***	-0.944***
	(0.028)	(0.029)	(0.029)	(0.029)	(0.027)	(0.033)	(0.035)	(0.184)
L.HDI2	0.199***	0.186***	0.176***	0.173***	0.117***	0.186***	0.181***	0.458***
	(0.022)	(0.023)	(0.023)	(0.023)	(0.022)	(0.027)	(0.029)	(0.120)
L.Dependency ratio		0.018***	0.017**	0.023***	0.012*	0.031***	0.034***	0.097***
		(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.016)
L.Population density			0.008**	0.006*	0.008**	0.012***	0.011**	0.078
			(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.064)
L.Female population				-0.203***	-0.135**	-0.094*	-0.057	-0.062
				(0.054)	(0.055)	(0.053)	(0.060)	(0.199)
L.Trade					-0.001	0.001	0.000	-0.005*
					(0.002)	(0.002)	(0.002)	(0.003)
L.Rule law						-0.008***	-0.007***	-0.004*
						(0.002)	(0.002)	(0.002)
L.Active participation							-0.012	0.003
							(0.008)	(0.012)
L.Self-employed								0.059***
								(0.016)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N observations	3,803	3,740	3,720	3,720	3,613	2,924	2,745	740
N countries	156	155	155	155	155	155	145	47
R^2 within	0.519	0.517	0.518	0.520	0.543	0.549	0.546	0.659
p > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. The constant is included but not reported in the table. From columns (6) to (8) data are available from 1997 to 2016.

Testing for non-linearities (2/2)

Bivariate correlation between *IE* and *HDI* (156 countries, 1990-2016)



Note: **Fitted values from the linear relation (dash line in black); fitted values from the non-linear relation (short-dash line in red).**

The HDI components

	Dep. variable: *IE*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.Health index	-0.056***	-0.061***	-0.061***	-0.061***	-0.077***	-0.093***	-0.087***	-0.515***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.013)	(0.045)
L.Education index	0.039***	0.051***	0.049***	0.049***	0.010	0.034**	0.045***	-0.011
	(0.012)	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)	(0.014)	(0.013)
L.Income index	-0.465***	-0.463***	-0.462***	-0.464***	-0.409***	-0.393***	-0.396***	-0.188***
	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.015)	(0.015)	(0.031)
Controls as before	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N observations	3,777	3,716	3,696	3,696	3,592	2,904	2,725	740
N countries	155	154	154	154	154	155	144	47
R^2 within	0.603	0.605	0.606	0.606	0.607	0.606	0.607	0.718
p > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. The constant is included but not reported in the table. From columns (6) to (8) data are available from 1997 to 2016.

DISCUSSION (1/2)

- **Robust and persistent negative coefficients of *HDI* on *IE* across specifications.**
  - ✓**H1 confirmed** → for increasing values of social progress, the level of informal economy decreases → *'virtuous' effect of social progress in lowering informal activities in our sample.*

- **The coefficient on *HDI* is negative, while that on *HDI2* is positive.**
  - ✓ **H2 confirmed** → *non-linear relationship between HDI and IE.*
  - ✓ **However, the overall effect of *HDI* on *IE*,** calculated **at different values of *HDI*** (e.g., 25th, 50th, 75th and 95th percentiles), **remains always negative** and statistically significant in our sample.

DISCUSSION (2/2)

- ***Health* and *Income* components (-) on *IE*; *Education* component (+) on *IE***

  ✓ **H3 confirmed** → the overall beneficial effect of *HDI* on *IE* is driven by the *Income* and *Health* components, whereas the *Education* component contributes to increase it.

  - ***Health*** → more healthy individuals have more chances to find a job in the formal sector. In aggregate, this would translate into a healthier labour force, likely leading to higher productivity, higher income returns and, hence, less room for informal activities**.**
  - ***Income*** → as the economy develops**,** countries could benefit from higher productivity and, thus, could have a better allocation of resources within the economy, and so smaller informal sectors.
  - ***Education*** → higher education could decrease the opportunity costs of engaging informal activities as increased competences acquired by it could be exploited to act in the shadow and find the best strategy for avoiding tax payments, or getting jobs with more flexible conditions, or producing/acquiring goods and services out of the rules of law.

ROBUSTNESS CHECKS

- **Methodological issues:** including a dummy variable equal to 1 for years after 2010 (included) and 0 before due to different calculation of *HDI* → **results confirmed and dummy not statistically significant.**

- **Sub-groups of countries:** *OECD-EU; Latin America; Post-Socialist; MENA; Sub-Saharan Africa; Asia* → **results confirmed; *exceptions for MENA and Latin America*** *(HDI positive and/or not statistically significant).*

- **Alternative measures of *IE*:** informal economy by Medina & Schneider (2017) → **results hold**.

- Possible **endogeneity concerns** between IE and HDI → **results hold** (*IV estimates with internal and external instruments*).

CONCLUSIONS

- We have found that **social progress exerts a strong negative effect on the extent of informal economy**, although this reducing effect tends to decrease at higher levels of social progress.

- The **negative (= 'virtuous') effect** is the overall result of **different driving forces.**
  - ✓In particular, the other generated by the *Education* component reveals that its role has gradually changed over time in the life of people, who can exploit higher education levels to escape fiscal and other compliance as well as incentives to act in the informal sector.

- **From a policy perspective**, **labour market reforms** could be advisable to exploit the virtuous impact of the *Health* component and limit the perverse effect of the *Education* one on IE (e.g., the promotion of health insurance programs in the formal sector; the creation of a favourable employment environment).

Thank you for your attention!

agnese.sacchi@uniroma1.it

Sub-groups of countries

	Dep. variable: *IE*					
	OECD&EU	*Latin*	*PostSocialist*	*MENA*	*SubSaharan*	*Asia*
L.HDI	-0.239***	0.064	-0.529***	0.287***	-0.386***	-0.700***
	(0.031)	(0.077)	(0.099)	(0.071)	(0.041)	(0.106)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N of observations	536	406	488	239	747	329
N of countries	27	21	13	15	41	18
R^2 within	0.669	0.719	0.535	0.736	0.624	0.715
p > F	0.000	0.000	0.000	0.000	0.000	0.000

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. Estimates and controls are based on column (7) in Table 2; data are available from 1997 to 2016.

Alternative measure of IE

	Dep. variable: *IE (Medina and Schneider 2017)*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.HDI	-0.509***	-0.498***	-0.515***	-0.501***	-0.492***	-0.610***	-0.598***	-0.367***
	(0.024)	(0.025)	(0.025)	(0.025)	(0.026)	(0.036)	(0.037)	(0.053)
L.Dependency ratio		0.023**	0.020**	0.032***	0.037***	0.040***	0.047***	0.072***
		(0.010)	(0.010)	(0.010)	(0.010)	(0.014)	(0.014)	(0.025)
L.Population density			0.035***	0.033***	0.034***	0.037***	0.039***	0.707***
			(0.005)	(0.005)	(0.005)	(0.007)	(0.008)	(0.110)
L.Female population				-0.395***	-0.368***	-0.318***	-0.339***	-1.011***
				(0.078)	(0.086)	(0.090)	(0.100)	(0.337)
L.Trade					-0.021***	-0.016***	-0.020***	-0.056***
					(0.003)	(0.003)	(0.003)	(0.005)
L.Rule law						-0.024***	-0.022***	-0.035***
						(0.003)	(0.003)	(0.004)
L.Active participation							0.042***	0.044**
							(0.013)	(0.020)
L.Self-employed								0.081***
								(0.026)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N observations	3,527	3,469	3,449	3,449	3,345	2,674	2,535	697
N countries	150	149	149	149	149	149	141	46
R^2 within	0.518	0.523	0.531	0.535	0.535	0.522	0.538	0.725
p > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. The constant is included but not reported in the table. From columns (6) to (8) data are available from 1997 to 2015.

IV estimates (1)

	Dep. variable: *IE*							
	Panel (a) - Internal instruments (5-*lagged HDI*)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.HDI	-0.797***	-0.804***	-0.899***	-0.902***	-1.109***	-0.626***	-0.635***	-0.537***
	(0.141)	(0.131)	(0.145)	(0.143)	(0.226)	(0.032)	(0.035)	(0.055)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage instruments								
$\widehat{L.HDI}$	0.032***	0.036***	0.033***	0.034***	0.022***	0.610***	0.588***	0.530***
N observations	3,687	3,626	3,606	3,606	3,507	2,835	2,668	735
N countries	156	155	155	155	155	155	145	43
F test (first stage)	61	74	63	66	29	2,384	2,055	371
Kl.-Paap LM (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: ***p < 0.01, ** p < 0.05, * p < 0.1. Robust SE are reported in brackets. The constant is included but not reported in the table. Controls are those used in Table 2. From columns (6) to (8) data are available from 1997 to 2016. **In panel (a), *L.HDI* is instrumented with the 5-lagged values of *HDI***

IV estimates (2)

	Panel (b) - External instruments (*IMR*)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
L.HDI	-0.356***	-0.352***	-0.366***	-0.363***	-0.420***	-0.423***	-0.439***	-0.821***
	(0.036)	(0.037)	(0.037)	(0.037)	(0.036)	(0.053)	(0.056)	(0.091)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage instruments								
$\widehat{L.HDI}$	-0.069***	-0.069***	-0.069***	-0.068***	-0.066***	-0.054***	-0.056***	-0.040***
N observations	3,777	3,740	3,720	3,720	3,613	2,924	2,745	736
N countries	155	155	155	155	155	155	145	43
F test (first stage)	1,070	1,080	1,069	1,072	970	516	501	139
Kl.-Paap LM (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: $^{***}p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust SE are reported in brackets. The constant is included but not reported in the table. Controls are those used in Table 2. From columns (6) to (8) data are available from 1997 to 2016**. In panel (b), *L.*HDI is instrumented with the *L.IMR* (in log).**