

Shedding Light on the Shadow Economy

A Global Database

Leandro Medina
(lmedina@imf.org)

International Monetary Fund

Friedrich Schneider
(friedrich.schneider@jku.at)

Johannes Kepler University of Linz

IMF Seventh Statistical Forum
November 14-15, 2019
Washington D.C.

Overview

1. Motivation
2. Estimation Methods
3. MIMIC Model
4. Baseline Results
5. Robustness Tests
6. Key Messages and Policy Implications

“The shadow (informal, black, unreported) economy comprises economic activities that circumvent costs and are excluded from the benefits and rights incorporated in laws and administrative rules covering property relationships, commercial licensing, labor contracts, torts, financial credit, and social systems”

E. Feige (2005)

1. The Importance of Measuring the Shadow Economy

- It is large and persistent, severely limits tax revenues
- Low productivity → Low economic growth
- Safety net: It provides employment and income

2. Estimation Methods (2)

Direct approaches

- Surveys and samples based on voluntary replies, tax audits, other compliance methods
- Gather detailed information
- Drawback
 - Results sensitive to the way the questionnaire is formulated
 - Willingness to cooperate...
 - ... admit participating in informal activities

2. Estimation Methods (3)

Indirect or indicator-based approaches

i. Discrepancy between expenditure and income statistics (MacAfee, 1980; Yoo and Hyun, 1998)

- Difference between national expenditures and income approximates shadow economy size
- Drawback
 - Assumes all expenditure and income measures constructed without error

2. Estimation Methods (4)

Indirect or indicator-based approaches

ii. Electricity approach (Kauffman and Kalibarda, 1996)

- Electricity consumption best in indicator of GDP, estimated elasticity of close to one
- Drawback
 - Not all informal activities require electricity
 - Elasticity may vary across countries and over time
 - Technical progress, use of other factors

2. Estimation Methods (5)

Indirect or indicator-based approaches

iii. Currency demand approach (Tanzi, 1980)

- Increased informal activity rises demand for currency, after controlling for other factors can isolate excess demand
- Drawback
 - Potentially underestimate as all informal transactions might not be in cash.
 - Procedure: Arbitrary to assume equal velocity in both sectors.

2. Estimation Methods (6)

Indirect or indicator-based approaches

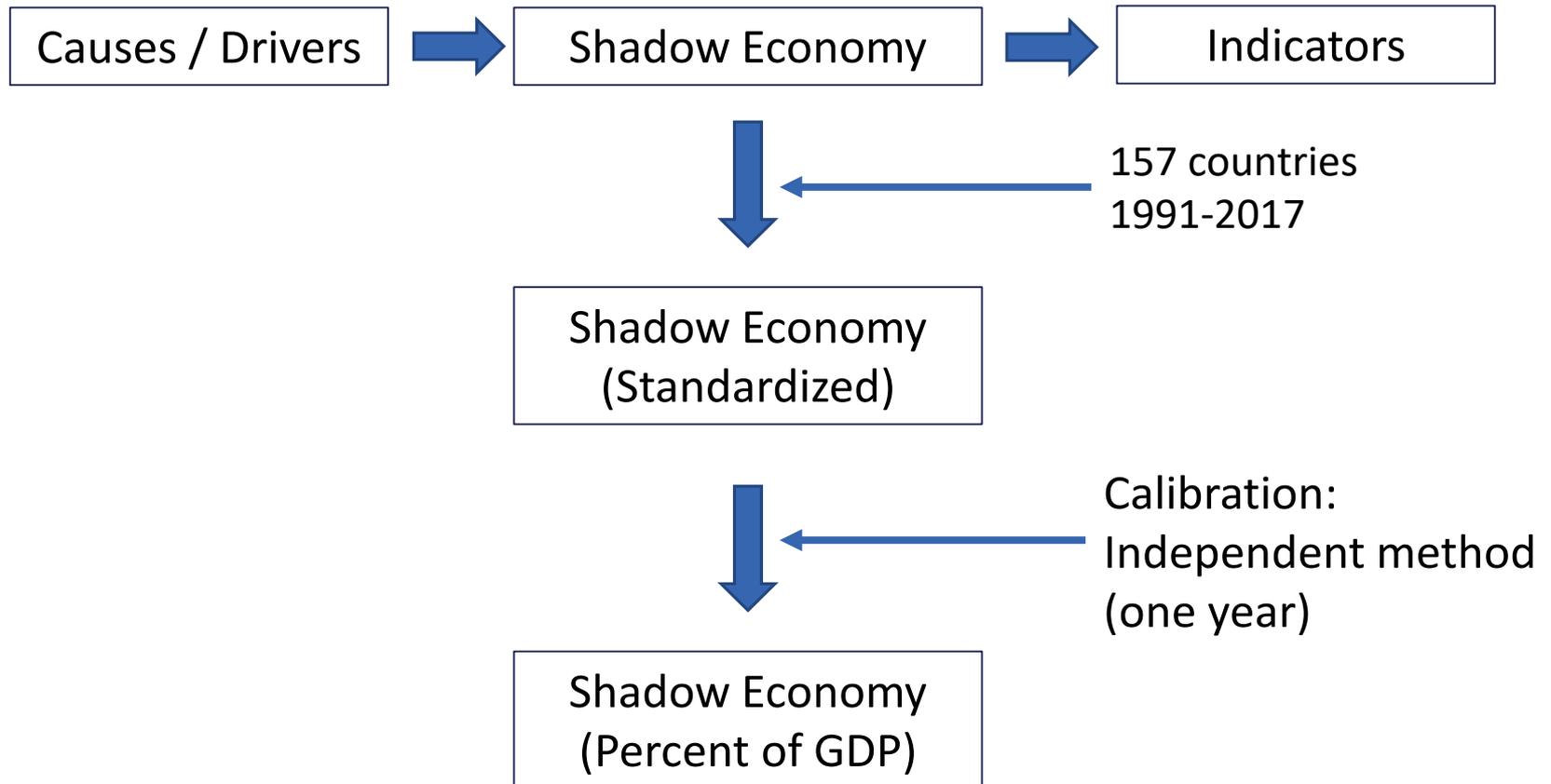
iv. Multiple Indicators Multiple Causes (MIMIC)

(Schneider and Enste, 2000)



3. MIMIC Model (1)

Size of the *Shadow Economy*



3. MIMIC Model (2)

Size of the *Shadow Economy*

- Drivers of the *shadow economy*:
 - **Fiscal freedom**: Measure of tax burden on the economy
 - **Institutions**: Lack of respect for the law or high corruption would encourage informal economic activity.
 - **Unemployment**.
 - **Trade openness**: As international trade increases, harder to hide trade from authorities
- Indicators of the *shadow economy*:
 - **Currency** as a fraction of cash to M1 (People engaged in the informal economy usually conduct their activities in cash).
 - **Labor force participation**.
 - A measure of the *size of the economy* using **night lights**.

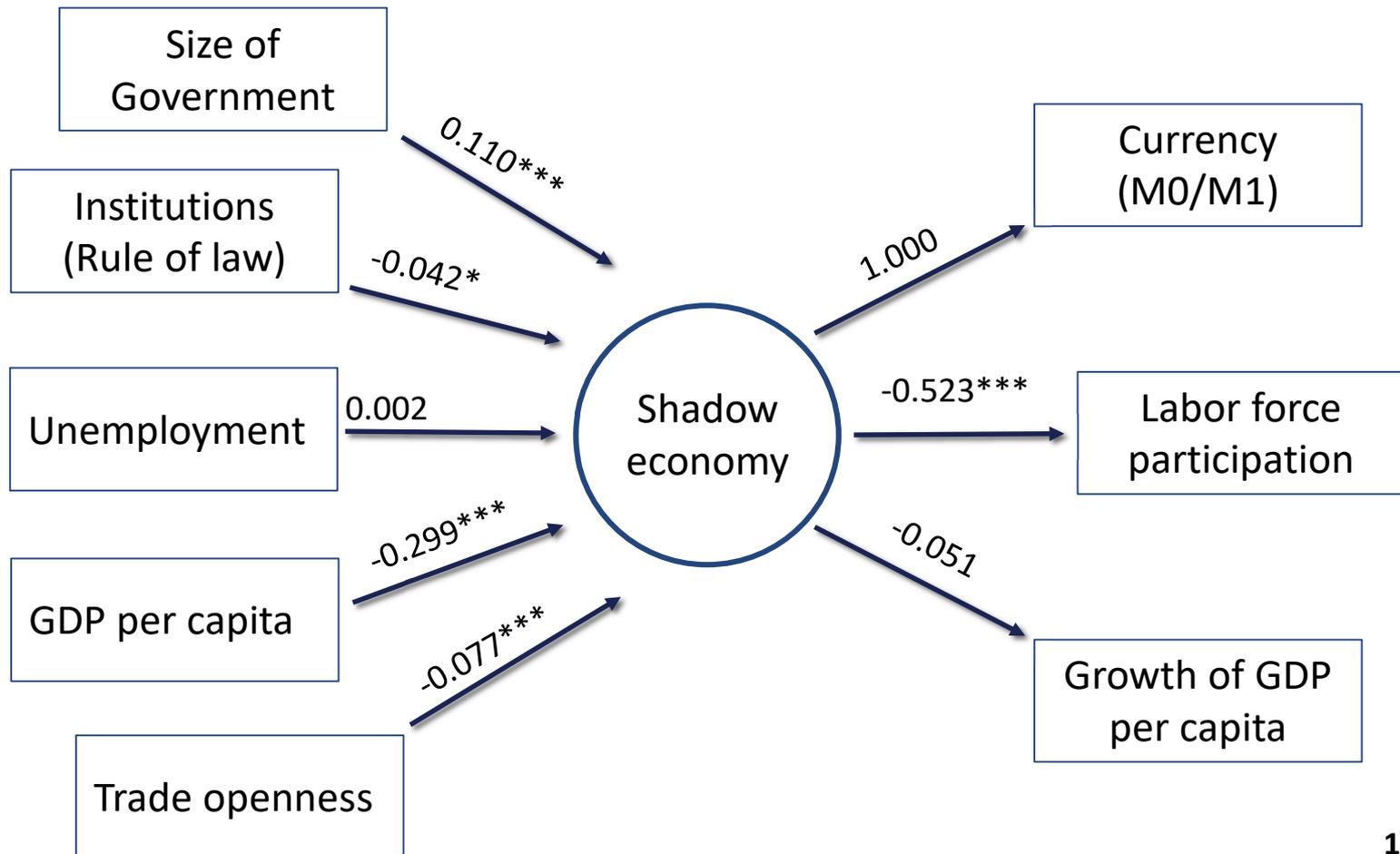
4. Baseline Results (1)

**Table 4.1. MIMIC Estimation Results-157 countries
1991-2017**

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Causes</i>						
Trade Openness	-0.077***	-0.074***	-0.097***	-0.063**	-0.062**	-0.097***
GDP Per Capita	-0.299***	-0.304***	-0.347***	-0.244***	-0.256***	-0.290***
Unemployment Rate	0.002	0.004	0.026	-0.001	0.003	0.044*
Size of Government	0.110***	0.115***	0.140***			
Fiscal Freedom				-0.097***	-0.101***	-0.105***
Rule of Law	-0.043*			-0.057**		
Control of Corruption		-0.067***			-0.062***	
Government Stability			-0.045*			-0.038
<i>Indicators</i>						
Currency	1	1	1	1	1	1
Labor Force Participation Rate	-0.523***	-0.525***	-0.410***	-0.529***	-0.523***	-0.389***
GDP Per Capita Growth	-0.051	-0.100	-0.241***	0.088	0.048	-0.097*
<i>Statistical Tests</i>						
RMSEA	0.061	0.052	0.057	0.051	0.043	0.048
Chi-square (model vs. saturated)	87.902	66.165	89.216	61.262	46.931	58.653
Chi-square (baseline vs. saturated)	419.447	401.916	582.586	340.457	326.345	432.786
Observations	2106	2100	2450	1980	1979	2109
Countries	150	150	122	147	147	120

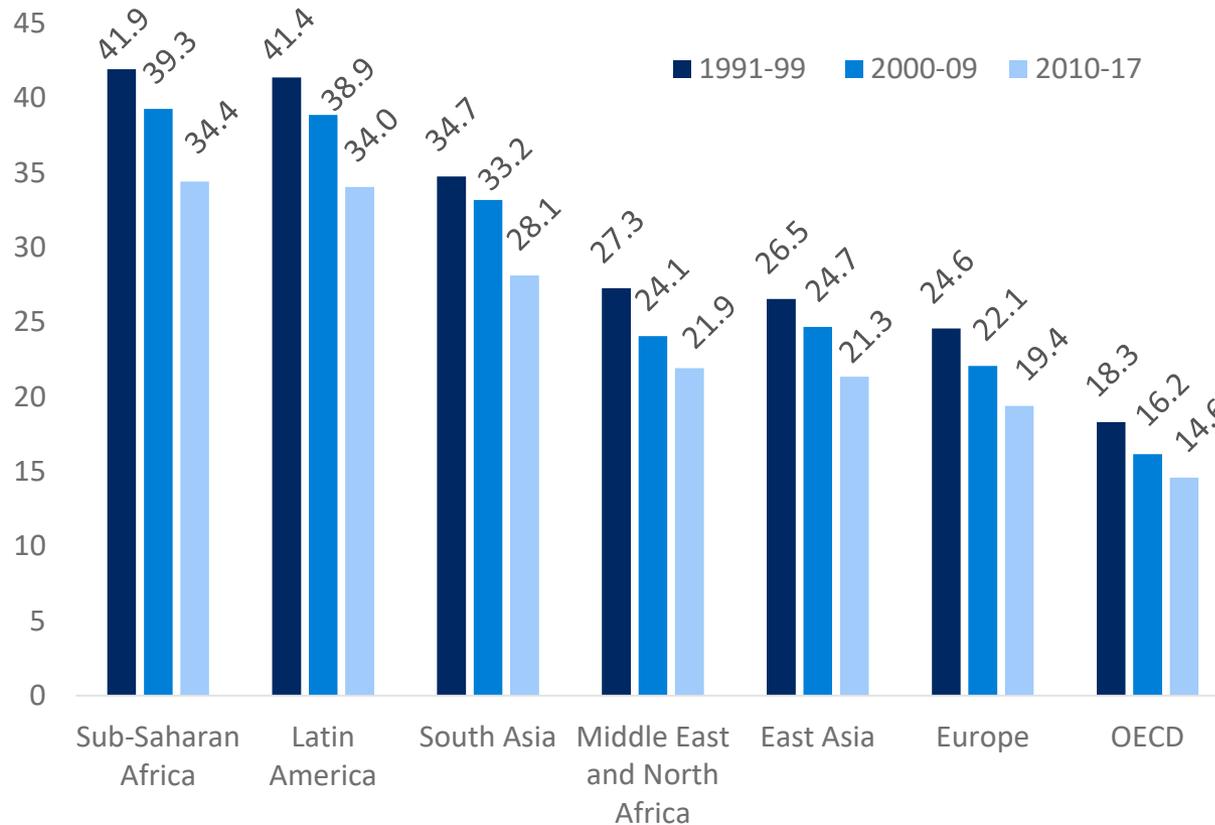
4. Baseline Results (2)

Figure 4.1



4. Baseline Results (3)

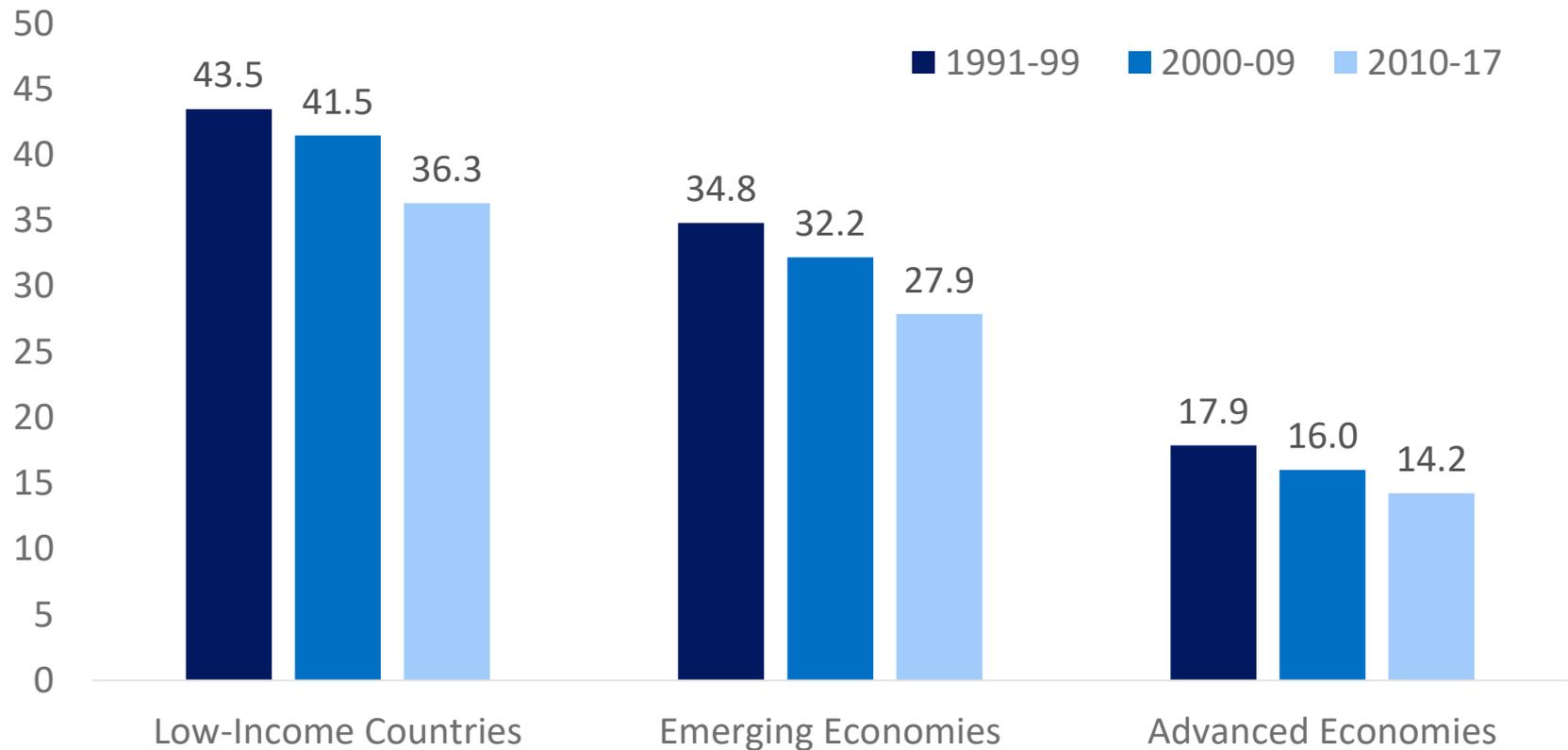
Chart 4.1. Size of the *Shadow Economy* in Regions



- *Shadow economy* is larger in SSA and LAC.
- Informality has decreased over time.
- Large heterogeneity within regions.

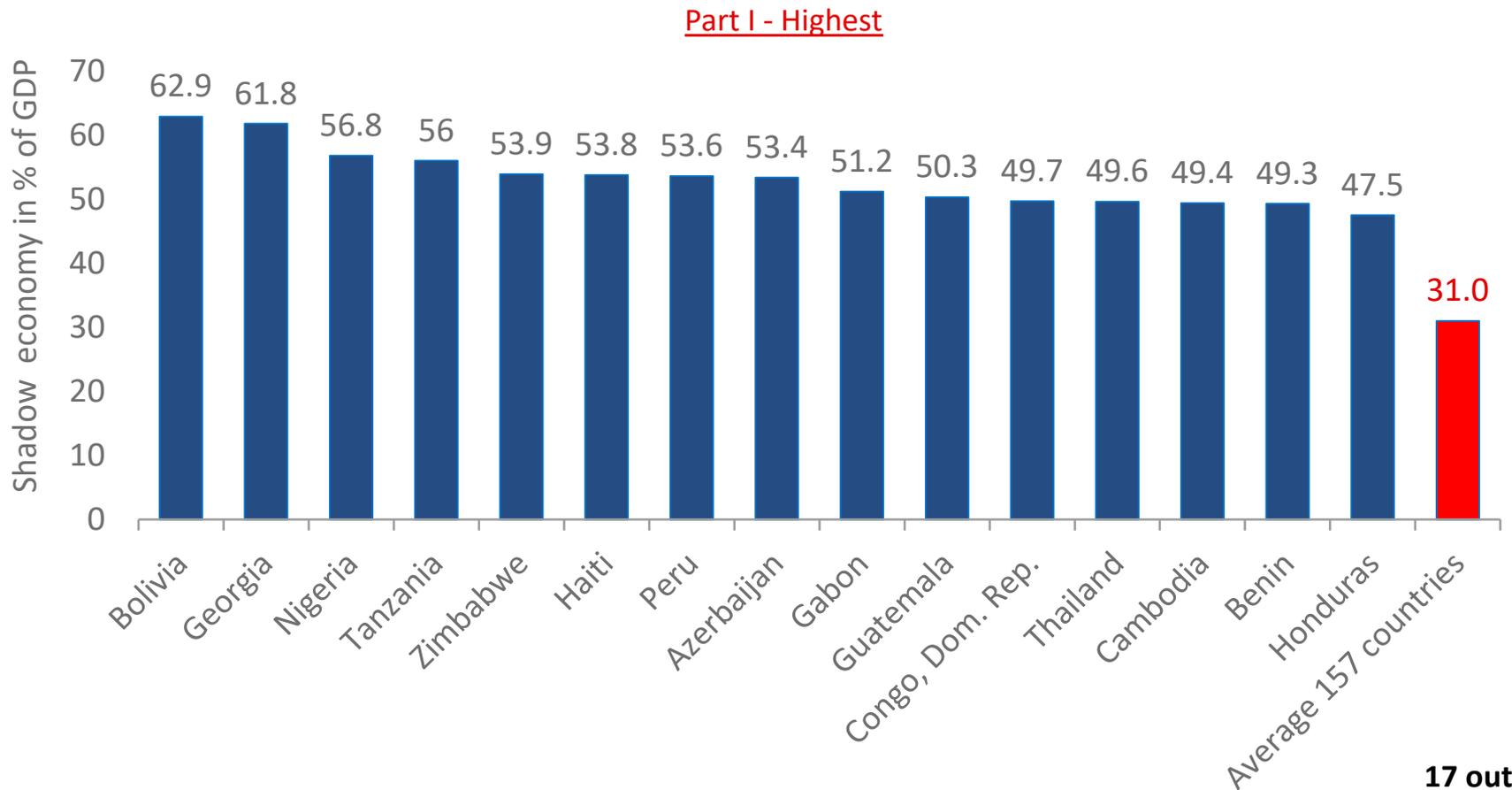
4. Baseline Results (4)

Chart 4.2. Size of the *Shadow Economy* in Regions



4. Baseline Results (5)

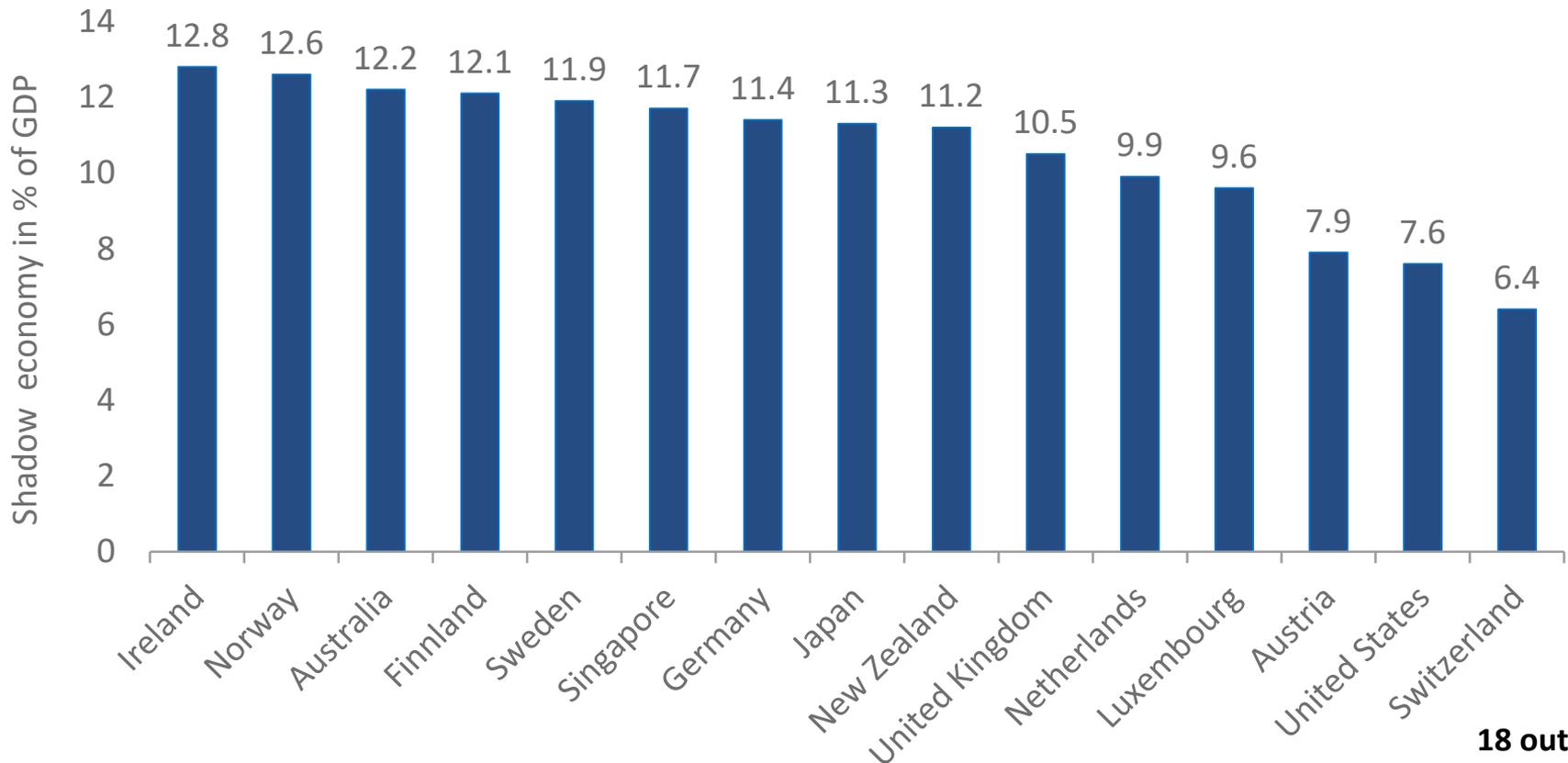
Chart 4.3. Size of the *Shadow Economy* in percent of GDP of the 15 countries with the highest and lowest *shadow economy* - Average over 1991 to 2017.



4. Baseline Results (6)

Chart 4.4. Size of the *Shadow Economy* in percent of GDP of the 15 countries with the highest and lowest *shadow economy* - Average over 1991 to 2017.

Part II - Lowest



5. Robustness Test (1)

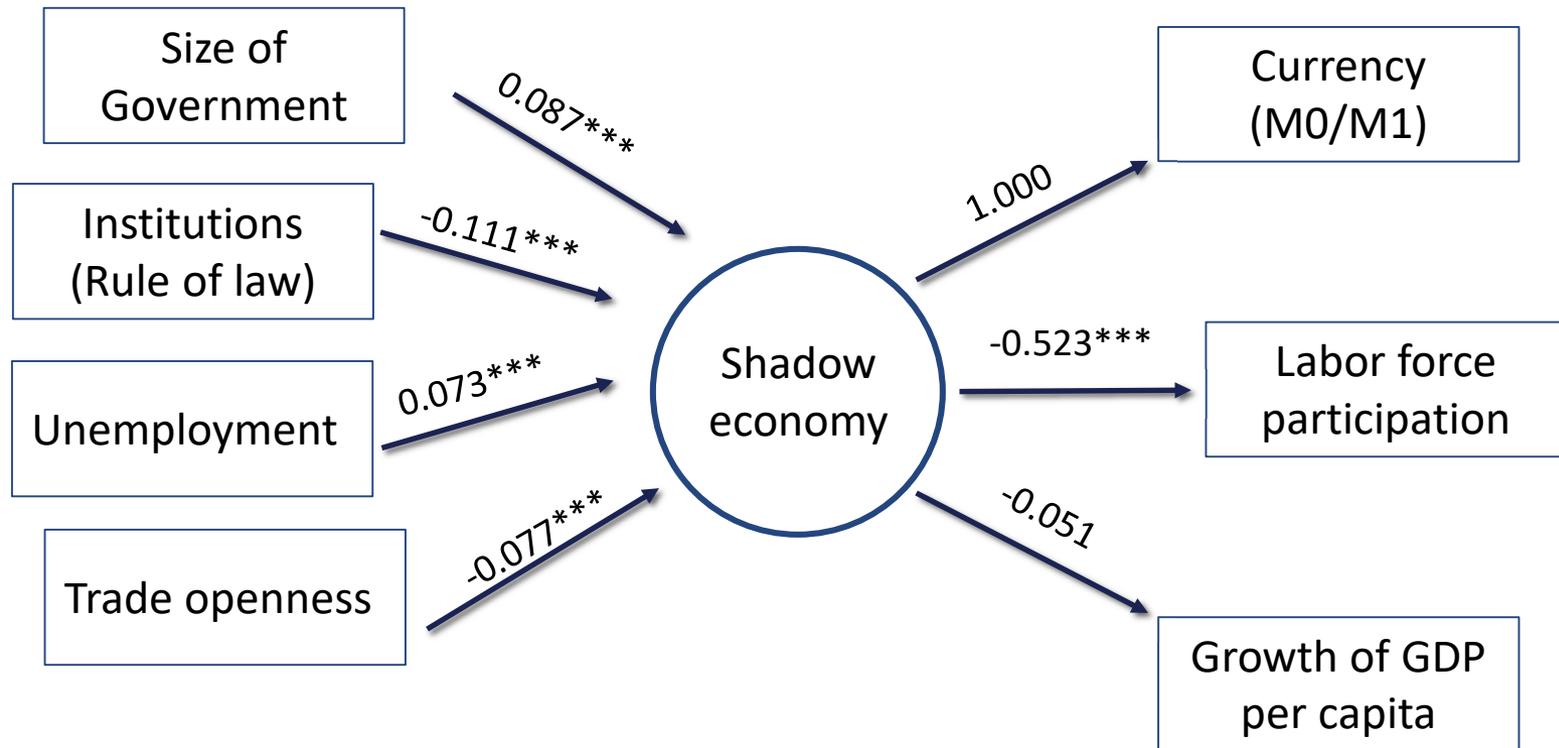
**Table 5.1. MIMIC Estimation Results-157 countries
1991-2017**
(Using night lights as proxy for size of the economy)

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Causes</i>						
Trade Openness	-0.115***	-0.114***	-0.160***	-0.094***	-0.092***	-0.145***
Unemployment Rate	0.073***	0.077***	0.016	0.049*	0.052*	0.076***
Size of Government	0.087***	0.085***	0.025			
Fiscal Freedom				-0.183***	-0.195***	-0.206***
Rule of Law	-0.111***			-0.087***		
Control of Corruption		-0.067***			-0.061**	
Government Stability			-0.021			0.043*
<i>Indicators</i>						
Currency	1	1	1	1	1	1
Labor Force Participation Rate	-0.382***	-0.403**	-0.672***	-0.388***	-0.374***	-0.335***
Night Lights	-0.061	-0.106	-1.000**	-0.107	-0.127	-0.249***
<i>Statistical Tests</i>						
RMSEA	0.075	0.074	0.089	0.073	0.071	0.079
Chi-square (model vs. saturated)	100.687	97.652	154.228	89.342	85.249	111.394
Chi-square (baseline vs. saturated)	229.236	201.404	386.432	246.099	230.385	352.713
Observations	2042	2036	2300	1926	1925	2047
Countries	147	147	120	145	145	118

5. Robustness Test (2)

Figure 5.1

(Using night lights as proxy for size of the economy)



5. Robustness Test (3)

Table 5.2. Comparing results with countries own statistics
(Rank correlation of 85 percent in Sub-Saharan African Countries)

Country	National Account Stat. ¹	MIMIC ²
Benin	55.6	49.0
Mali	55.0	40.4
Guinea-Bissau	53.4	38.0
Guinea	48.1	37.0
Senegal	47.5	40.0
Burkina Faso	43.1	32.0
Togo	40.1	28.0
Cote d'Ivoire	34.0	35.0

1. Mostly discrepancy method.
2. Our results.

6. Key Messages and Policy Implications (1)

6.1. Main Findings

- Size of the shadow economy is quite large in some regions (LAC and SSA).
- Sizable heterogeneity within regions.
- Informal sector acts as a safety net.
- Informal sector has low productivity and keeps productivity low in a vicious cycle.
- *Governance indicators* are generally associated with the size of the informal sector.

6. Key Messages and Policy Implications (2)

6.2. Policy Conclusions

In every country the government faces the challenge to undertake policy measures which reduce a shadow economy and tax evasion.

**However, the crucial question is:
“Is this a blessing or a curse?”**

Answer

- If one assumes, that roughly 50% of all shadow economy activities complement those of the official sector (i.e. those goods would not be produced in the official sector) the development of the total (official + shadow economy) GDP is always higher than the “pure” official one.

6. Key Messages and Policy Implications (cont.)

- A decline of the shadow economy will only increase the total welfare in every country if the policy maker succeeds in transferring a shadow economic activity into the official economy.
- Therefore, a policy maker must favor and choose such policy measures that strongly increase the incentives to transfer the production from the shadow to the official sector.

Only then the decline of the shadow economy will be a blessing for the whole economy.

Thanks!

Shedding Light on the Shadow Economy:
A Global Database
Leandro Medina and Friedrich Schneider
IMF Seventh Statistical Forum
November 14–15, 2019
Washington D.C.