



Business Climate, Productivity, and Competitiveness in Armenia, 2002-2005

Giuseppe Iarossi, World Bank

Federica Saliola, World Bank and University of Rome III

Giovanni Tanzillo, World Bank

Investment climate

“location-specific factors shaping the opportunities and incentives for firms to invest productively, create jobs, and expand”

World Development Report 2005

Business Climate Index (BCI)

1. Combines 93 variables
(macro and micro)
2. Geometric Aggregation Method

Variables in the BCI

4 categories, 2 dimensions

MACRO

Cost (6)

Quality (17)

INPUTS

Cost (10)

Quality (14)

INFRASTRUCTURE

Cost (4)

Quality (5)

INSTITUTIONS

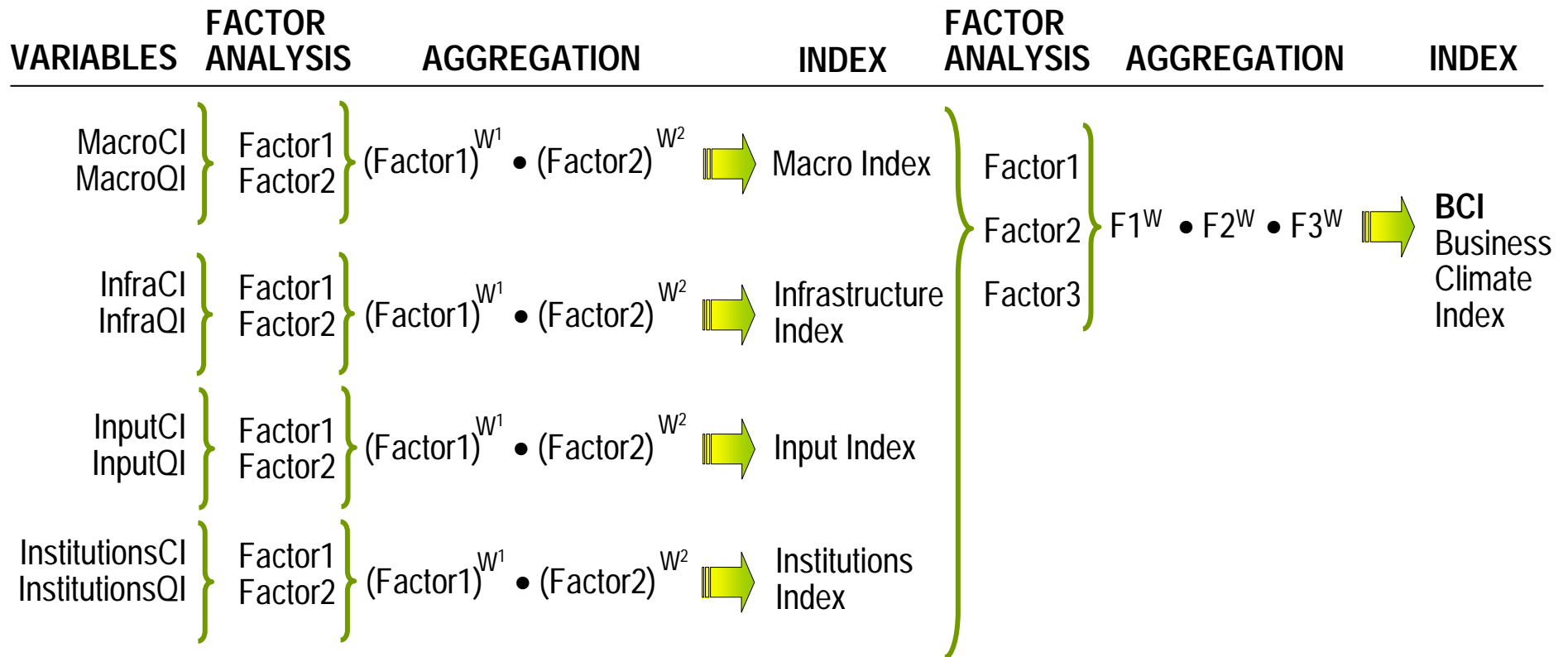
Cost (10)

Quality (27)

First step in the BCI construction

VARIABLES	FACTOR ANALYSIS	AGGREGATION	INDEX
Inflation variability Exchange rate variability Real interest rate variability Capital flows Macro instability Corruption index Procedures to start a business Cost to start a business Minimum capital to start a business Credit information index Private bureau coverage Procedures to enforce contracts Time to enforce contracts Cost to enforce contracts	Factor1 Factor2 Factor3 Factor4	$(\text{Factor1})^{W1} \cdot (\text{Factor2})^{W2} \cdot (\text{Factor3})^{W3} \cdot (\text{Factor4})^{W4} = \text{MacroQI}$	

Second and third steps in the BCI construction



Characteristic: Geometric aggregation method

$$BCI = (MACROindex)^w_m * (INPUTindex)^w_p * (INFRASTindex)^w_f * (INSTITindex)^w_t$$

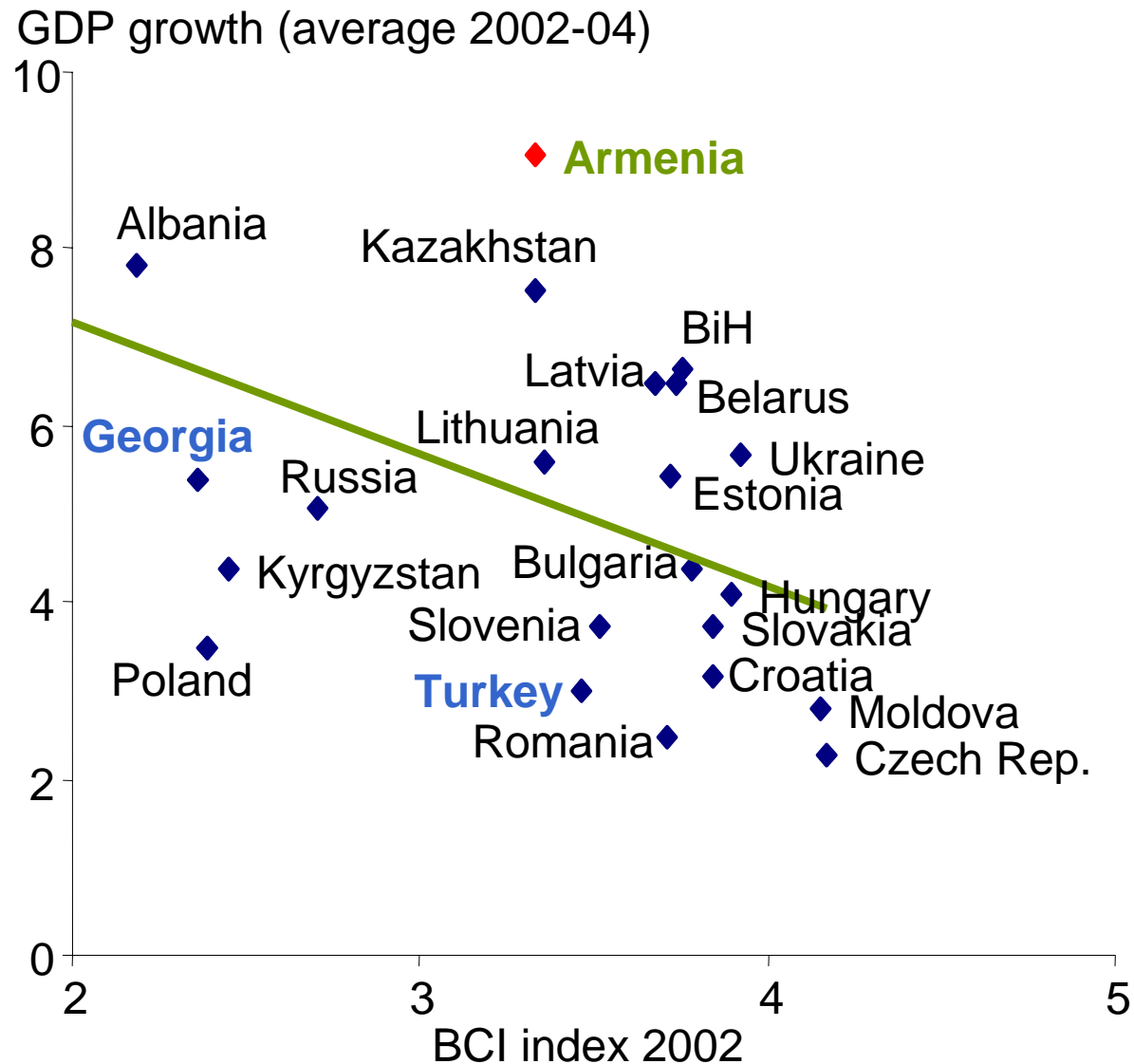
Feature:

Rewards more countries that improve the dimension where they perform the worst

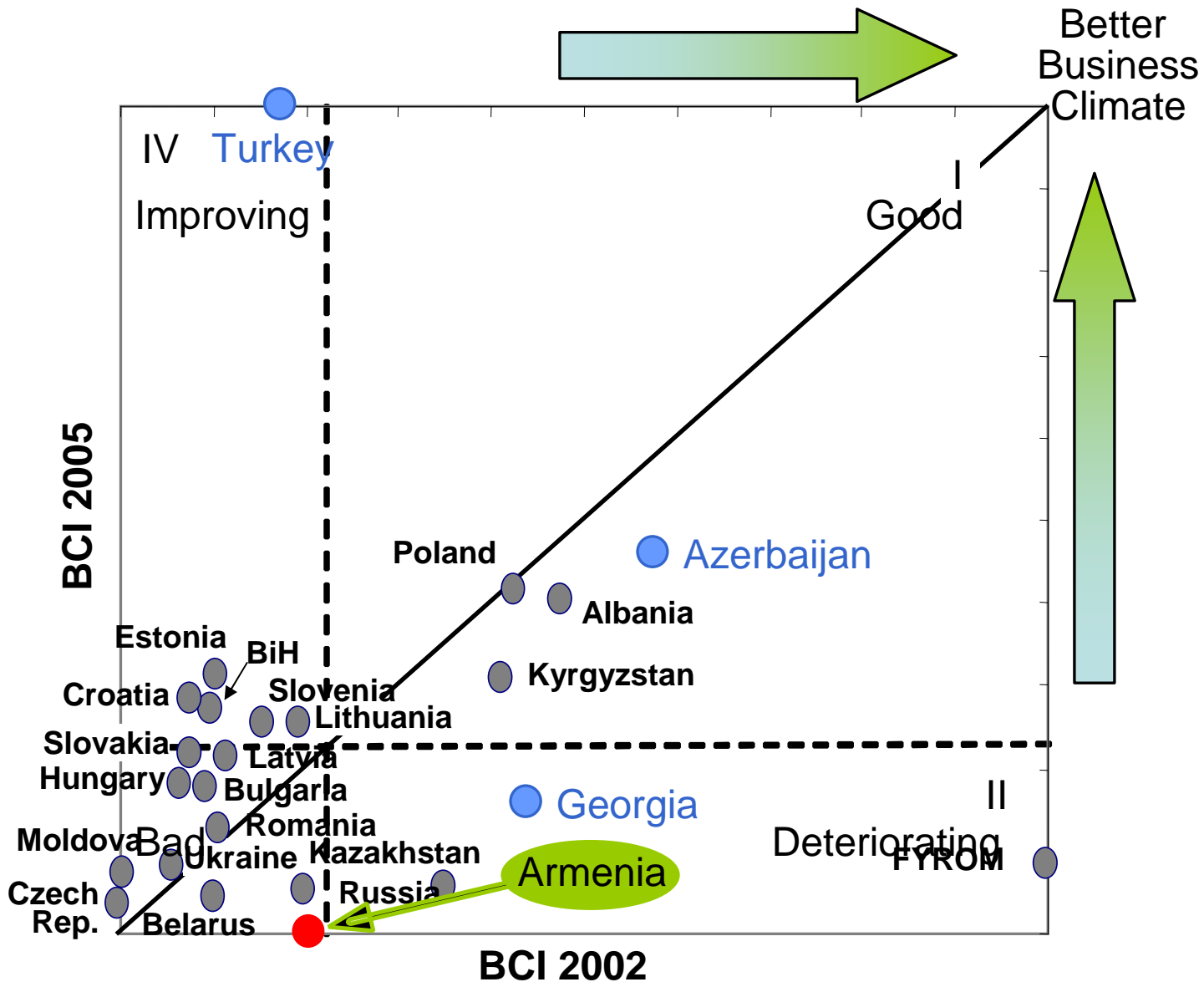
Country	2002	2005
1 Albania	170	204
2 Armenia	171	351
3 Azerbaijan	170	350
4 Belarus	250	325
5 Bosnia-Herz.	182	200
6 Bulgaria	250	300
7 Croatia	187	236
8 Czech Rep.	268	343
9 Estonia	170	219
10 Macedonia	170	200
11 Georgia	174	200
12 Hungary	250	610
13 Kazakhstan	250	585
14 Kyrgyzstan	173	202
15 Latvia	176	205
16 Lithuania	200	205
17 Moldova	174	350
18 Poland	500	975
19 Romania	255	600
20 Russia	506	601
21 Slovakia	170	220
22 Slovenia	188	223
23 Turkey	514	557
24 Ukraine	463	594

Sample composition of micro data

Business Climate Index and GDP growth in ECA, 2002-05



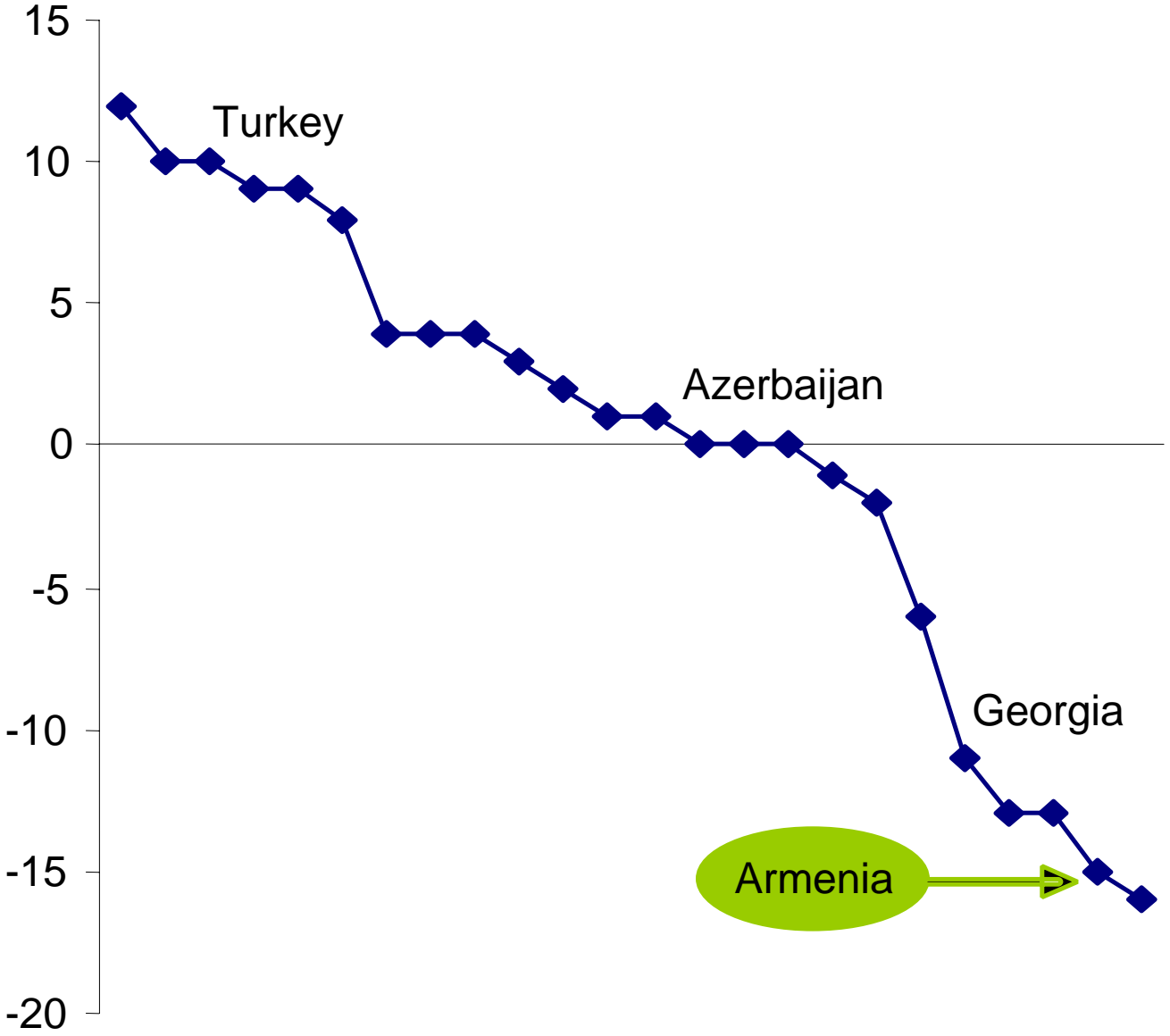
Change in business climate 2002-05



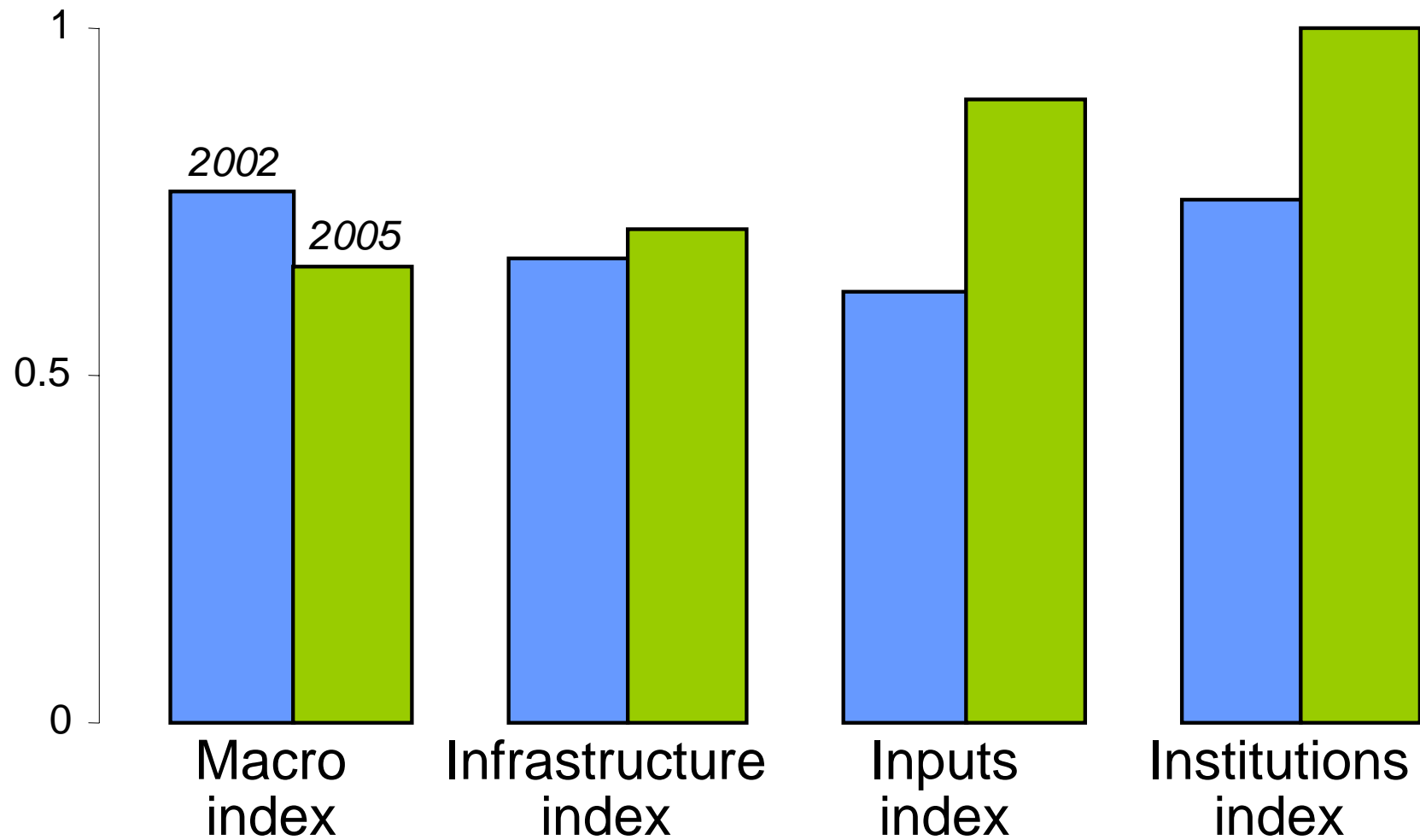
BCI Index and ranking of ECA countries, 2002-05

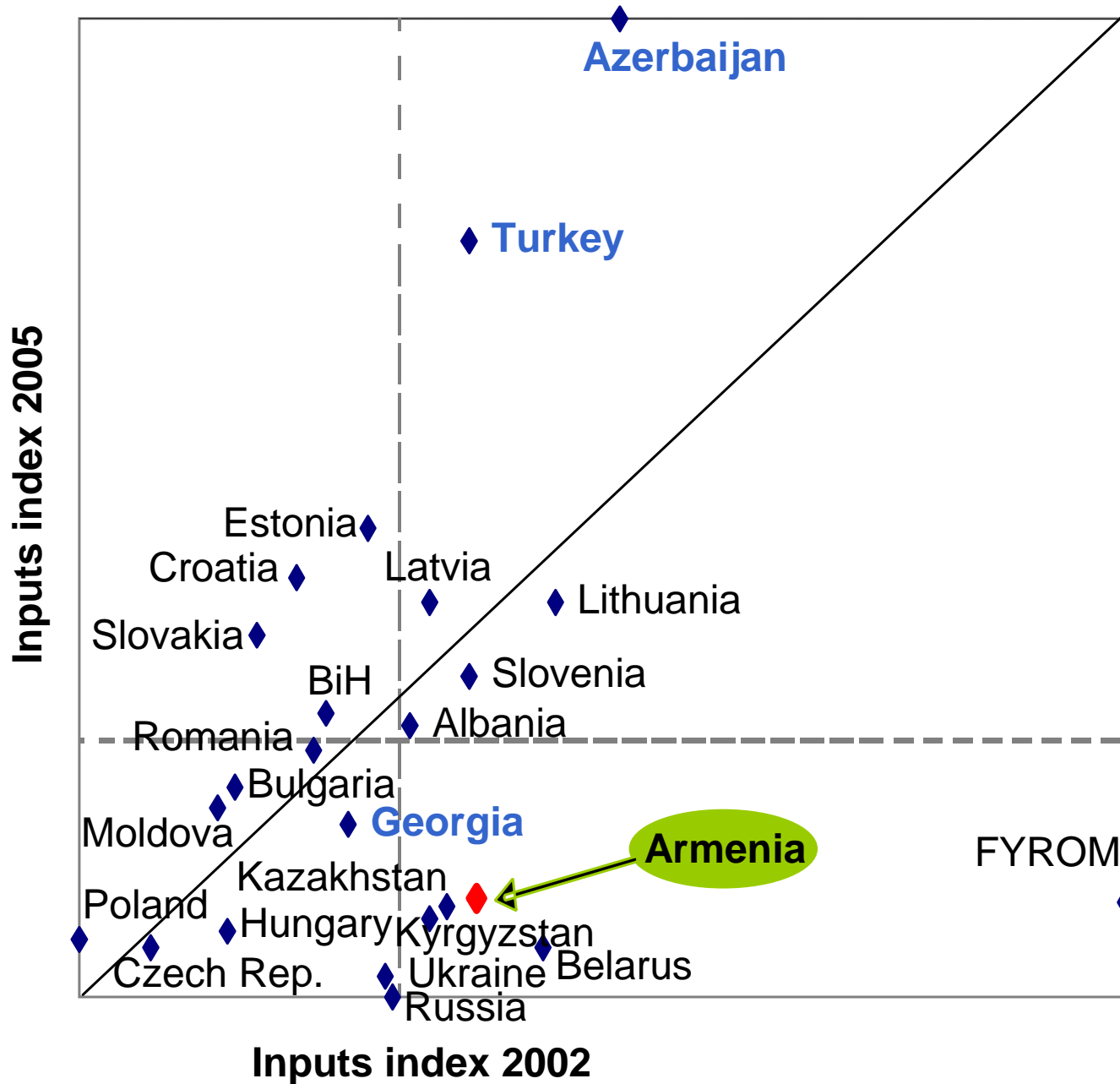
Country	Rank 2002	Country	Rank 2005
FYROM	1	Turkey	1
Azerbaijan	2	Azerbaijan	2
Albania	3	Poland	3
Georgia	4	Albania	4
Poland	5	Estonia	5
Kyrgyzstan	6	Kyrgyzstan	6
Russia	7	Croatia	7
Kazakhstan	8	BiH	8
Armenia	9	Slovenia	9
Lithuania	10	Lithuania	10
Turkey	11	Slovakia	11
Slovenia	12	Latvia	12
Latvia	13	Hungary	13
Romania	14	Bulgaria	14
Estonia	15	Georgia	15
Belarus	16	Romania	16
BiH	17	FYROM	17
Bulgaria	18	Ukraine	18
Croatia	19	Moldova	19
Slovakia	20	Russia	20
Hungary	21	Kazakhstan	21
Ukraine	22	Belarus	22
Moldova	23	Czech Rep.	23
Czech Rep.	24	Armenia	24

Change in ranking 2002-05

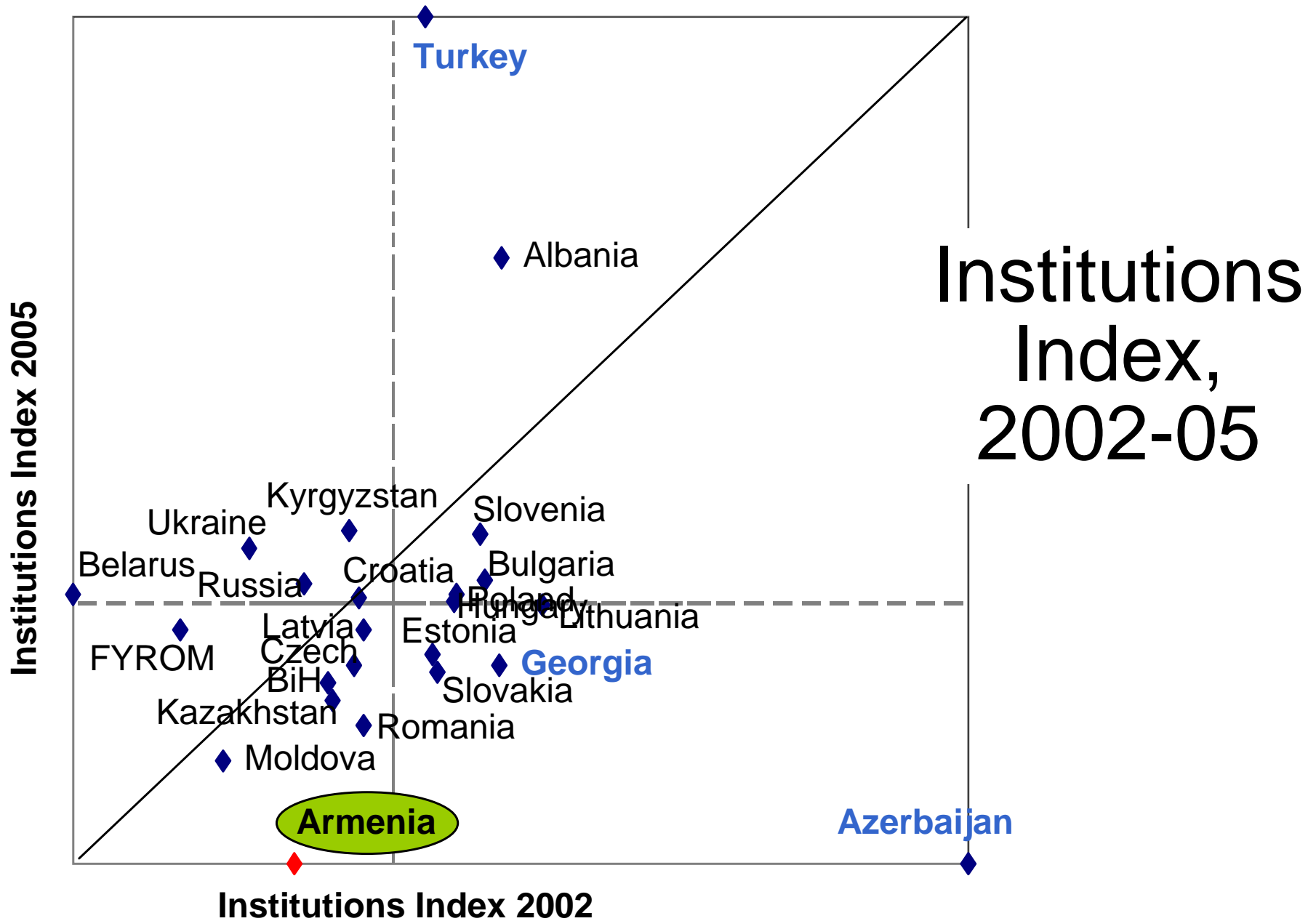


Components of BCI, 2002-05

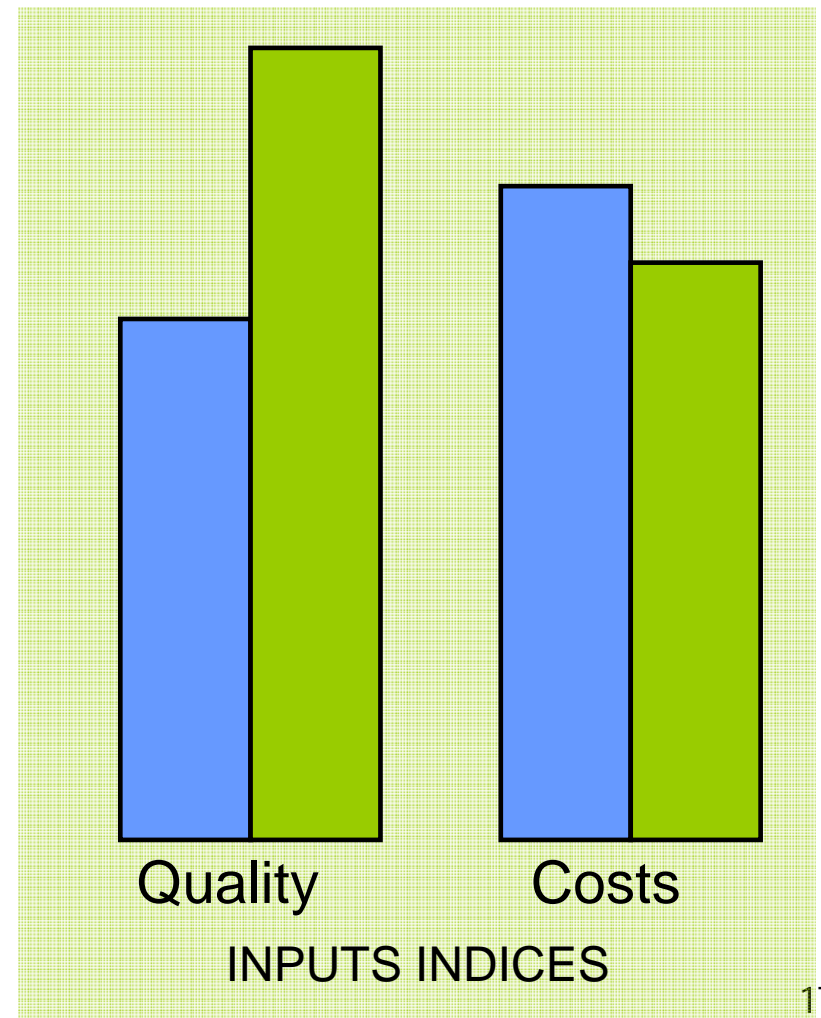
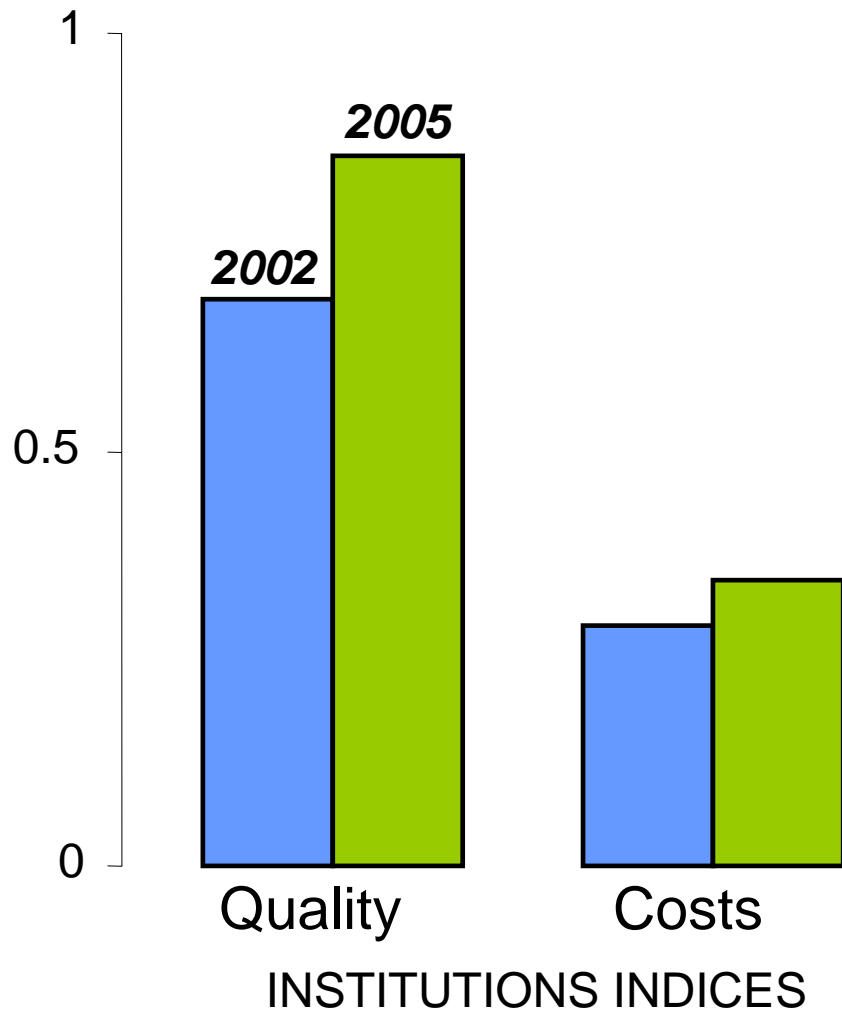




Inputs Market Index, 2002-05



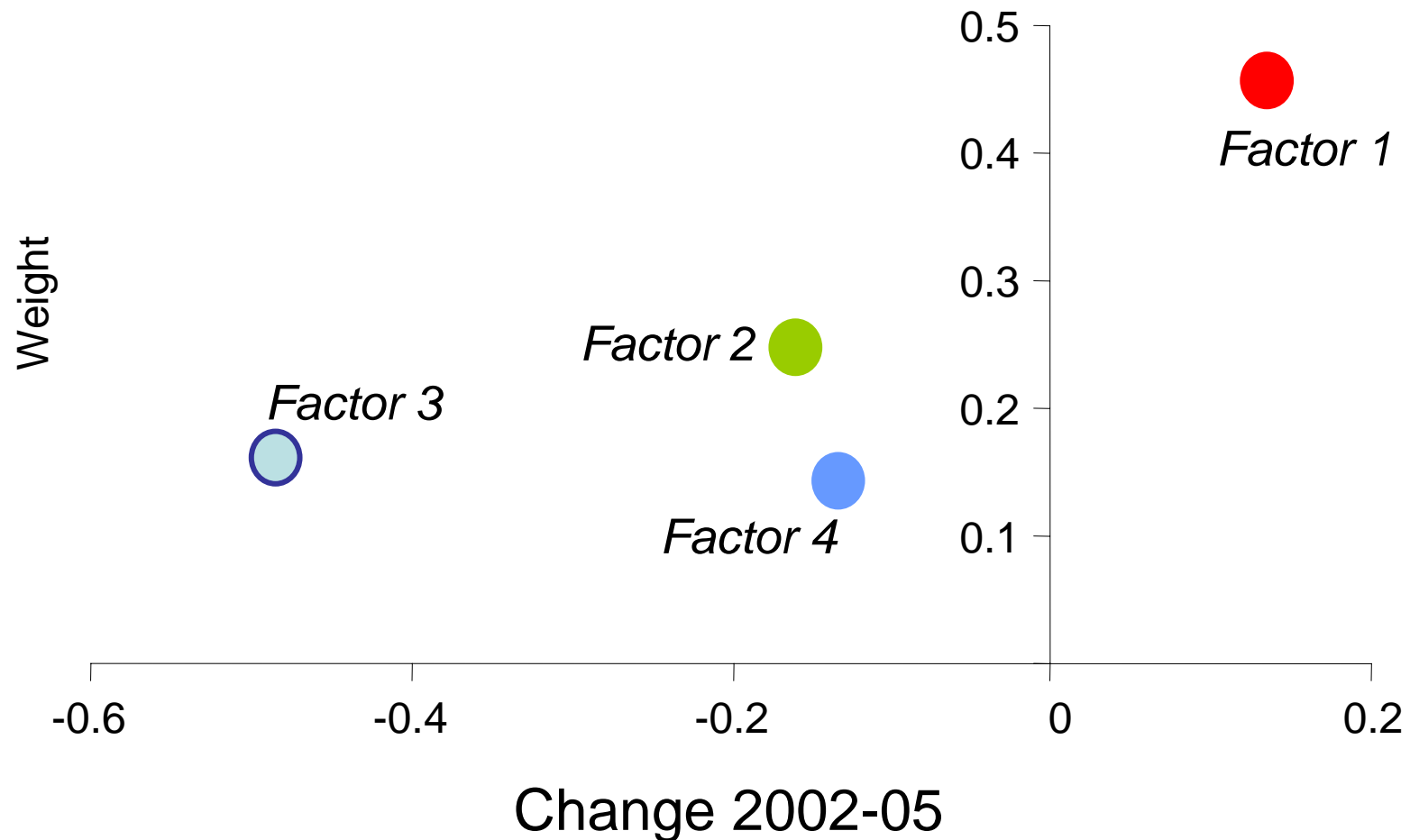
Dimensions of institutions and inputs indices in Armenia, 2002-05



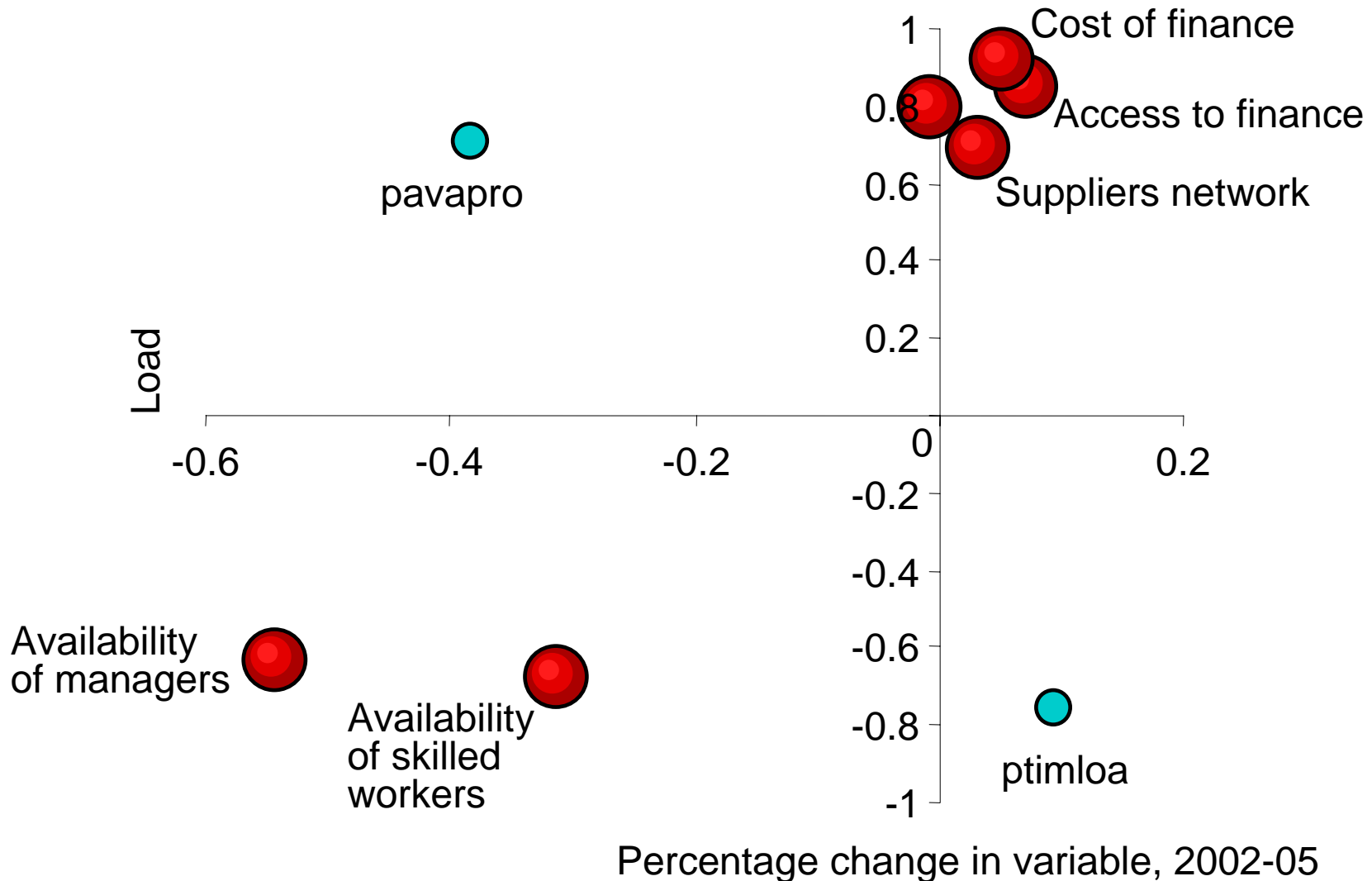
First step in the BCI construction

VARIABLES	FACTOR ANALYSIS	AGGREGATION	INDEX
Excess labor	Factor1 Factor2 Factor3 Factor4	$(\text{Factor1})^{W1} \cdot (\text{Factor2})^{W2} \cdot (\text{Factor3})^{W3} \cdot (\text{Factor4})^{W4} = \text{InputsQI}$	
Cost of finance			
Proximity to raw materials			
Access to foreign inputs			
Access to foreign customers			
Technology			
Education of workforce			
Access to finance			
Trade credit			
Availability of skilled workers			
Availability of managers			
Informality of supplier network			
Loan duration			

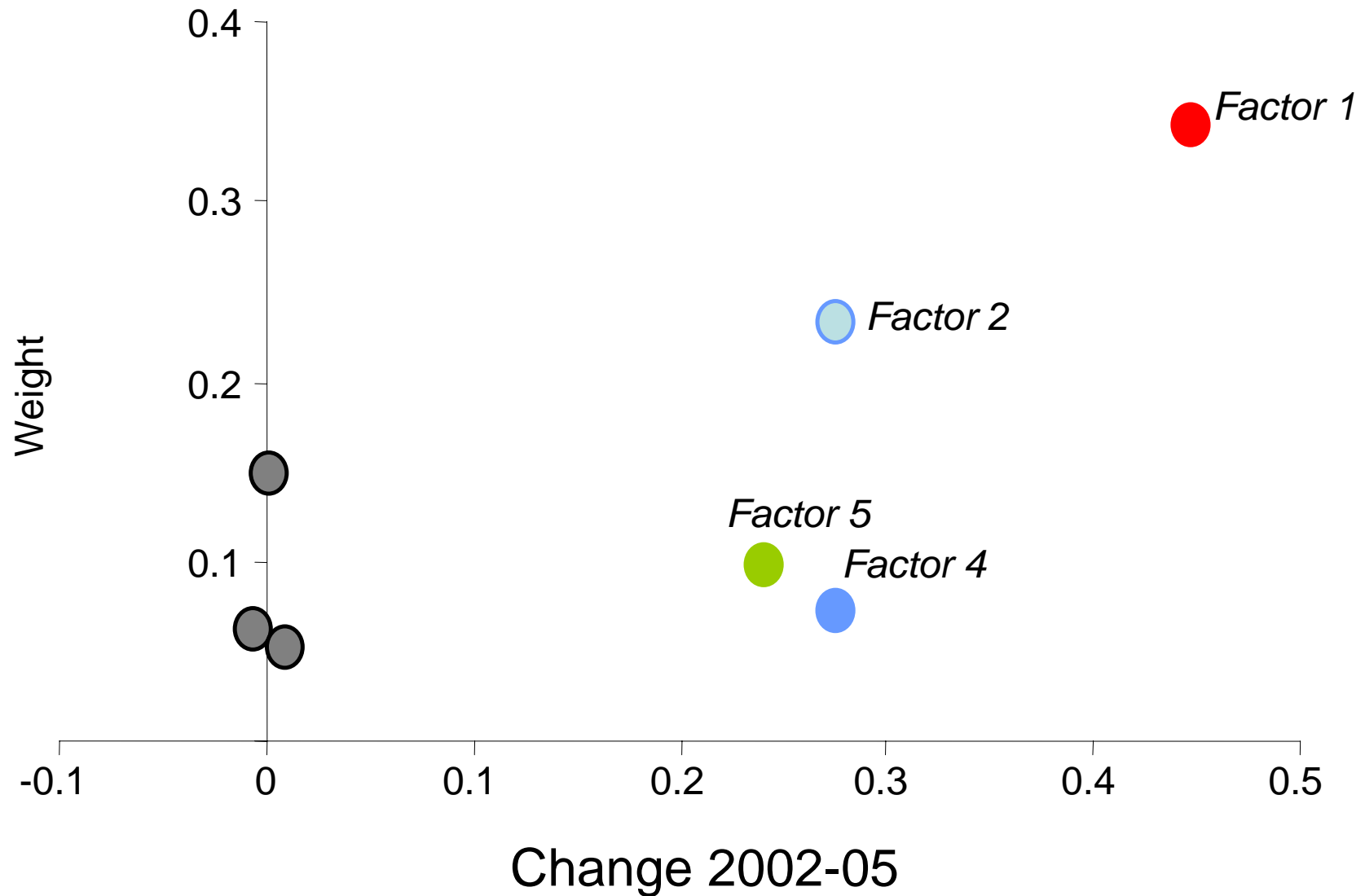
Principle component factors in the Inputs Quality Index



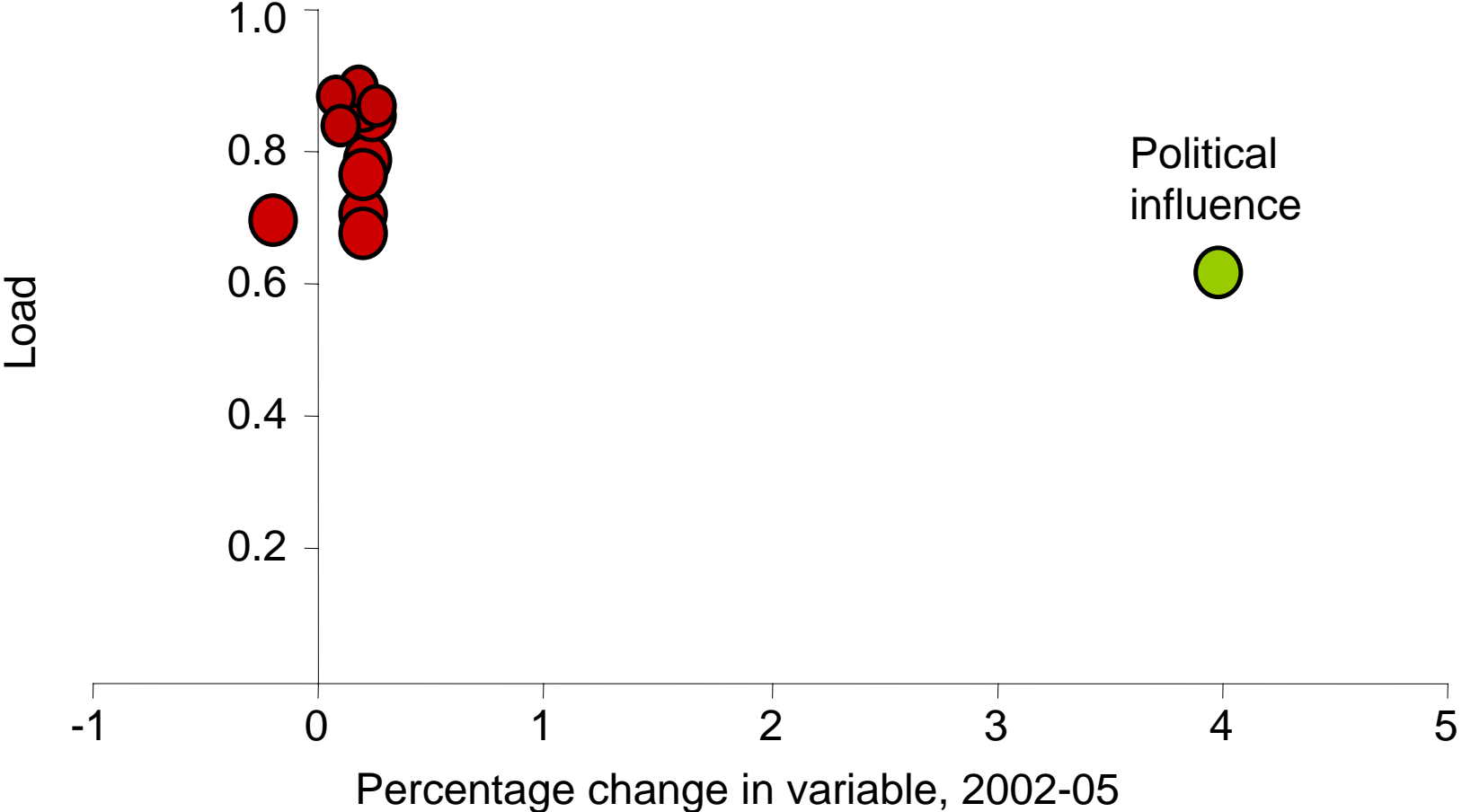
Main variables underlying Factors 1 and 3 of the Inputs Quality Index



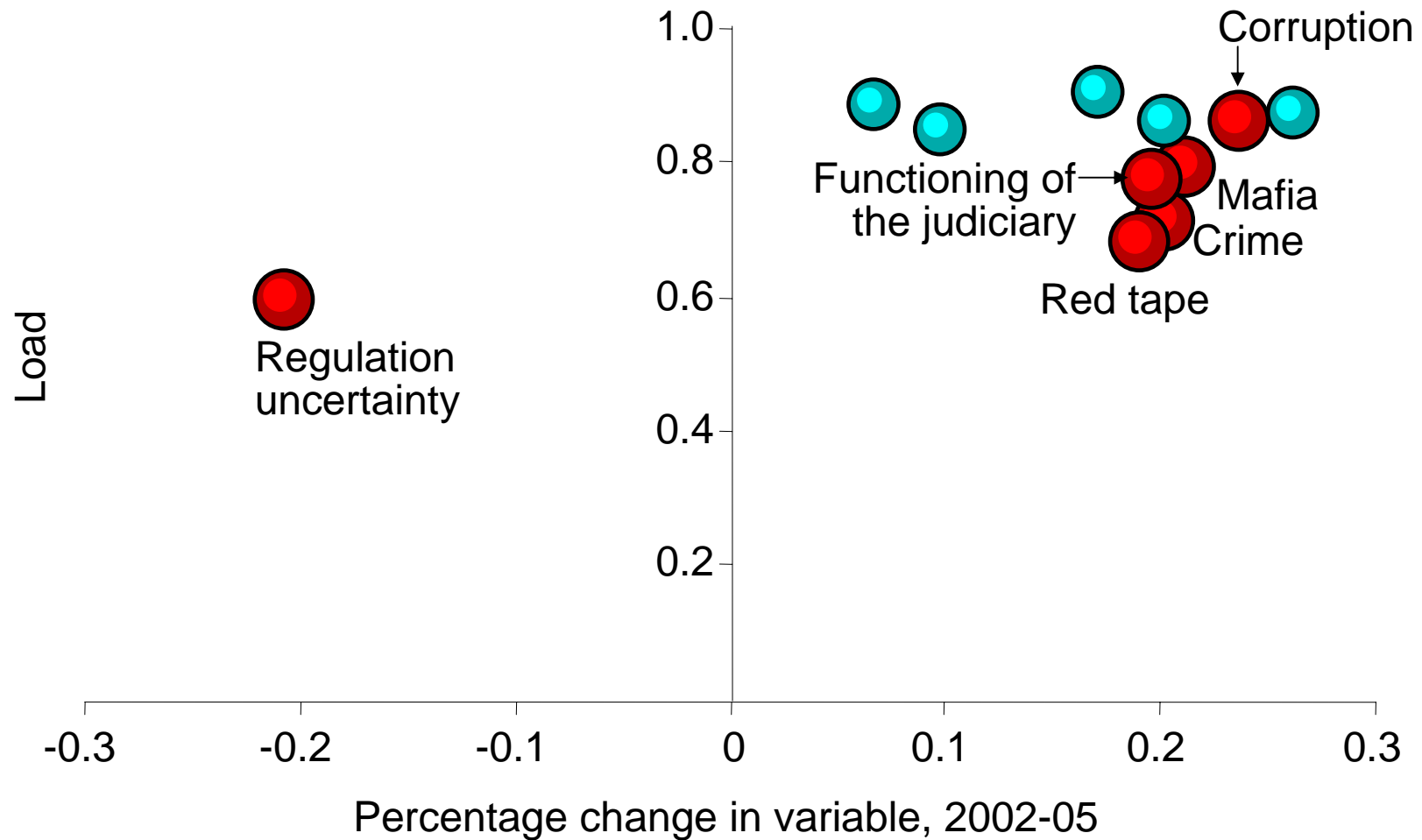
Principle component factors in the Institutions Quality Index



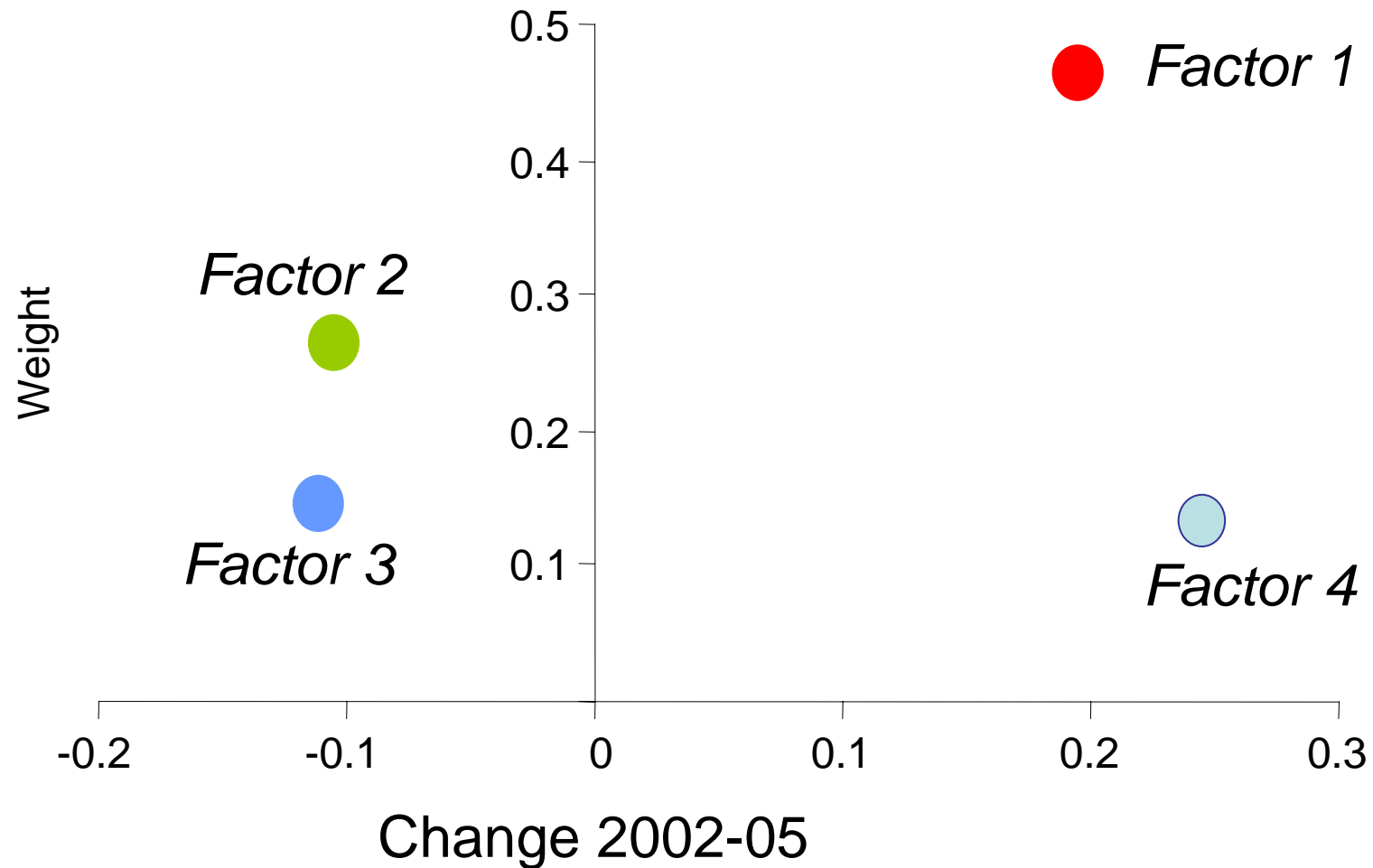
Main variables underlying Factors 1 and 2 of the Institutions Quality Index



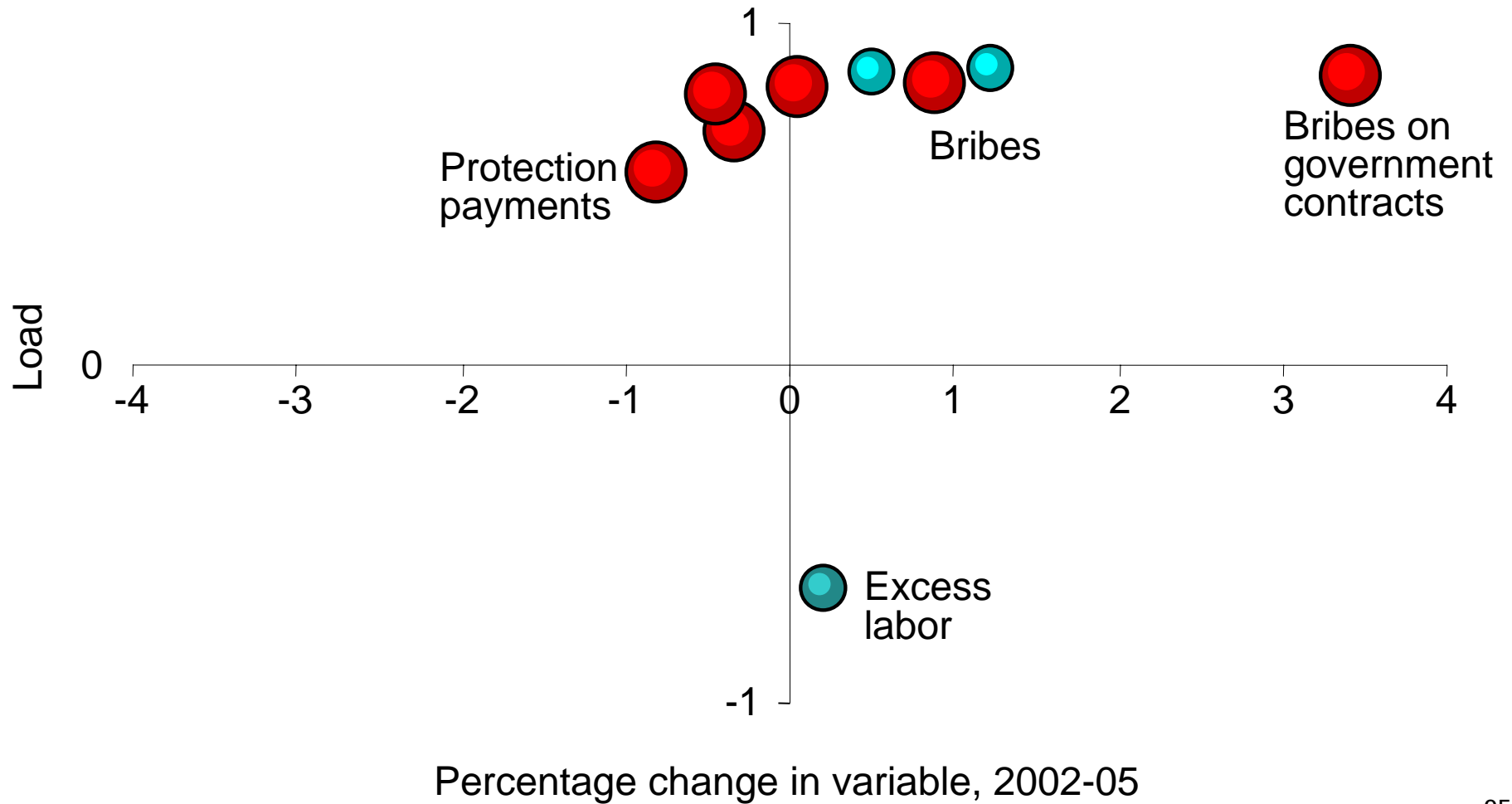
Main variables underlying Factors 1 and 2 of the Institutions Cost Index



Principle component factors in the Institutions Cost Index



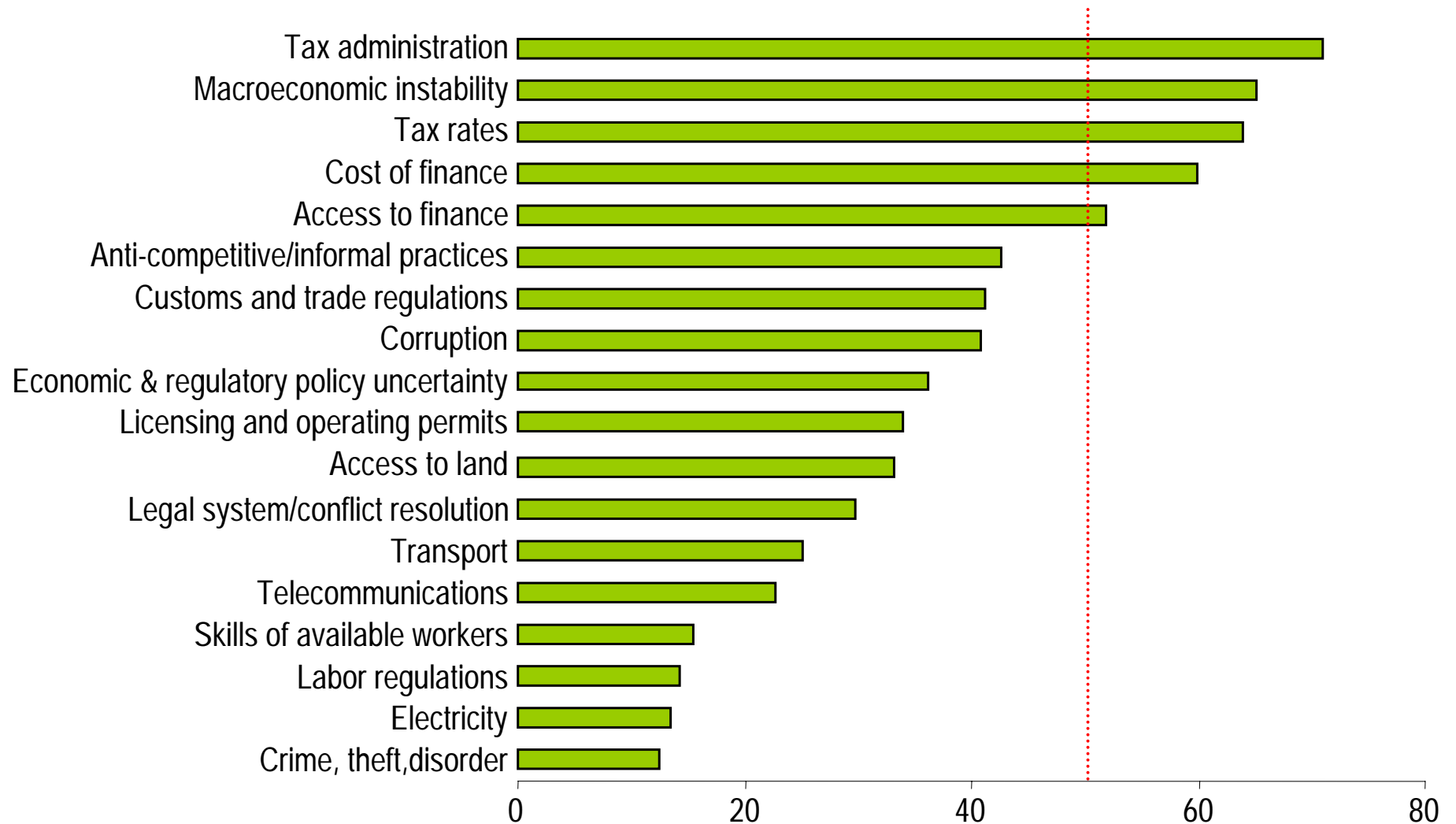
Main variables underlying Factors 1 and 2 of the Institutions Cost Index



Conclusions

- Institutions:
both perceptions and costs have contributed to the deterioration of the business climate in Armenia in the last three years
 - More specifically, political influence, corruption, security, red tape, judicial inefficiency
 - To a lesser extent, also access and cost of credit

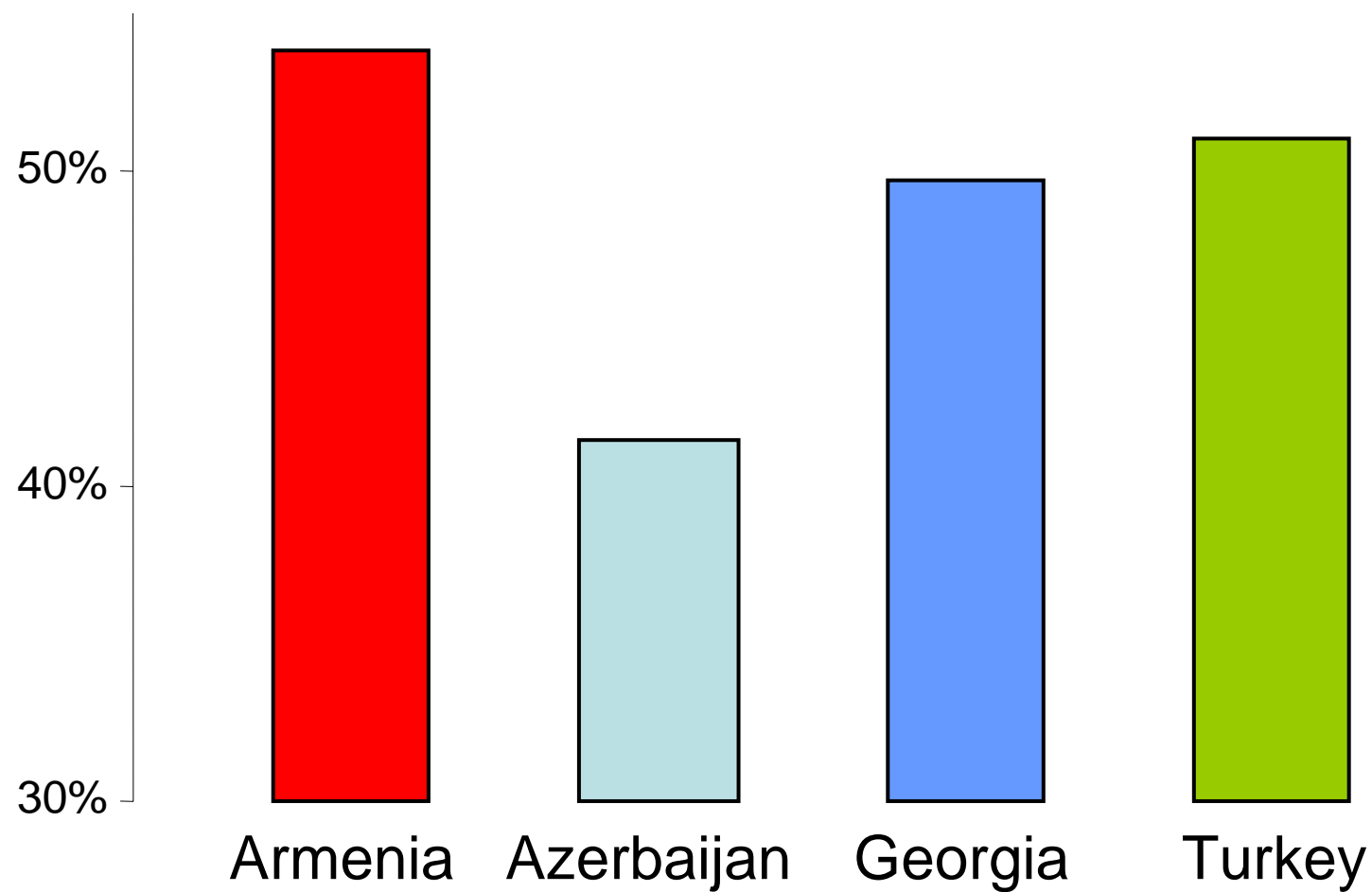
Armenia's perception of investment climate constraints



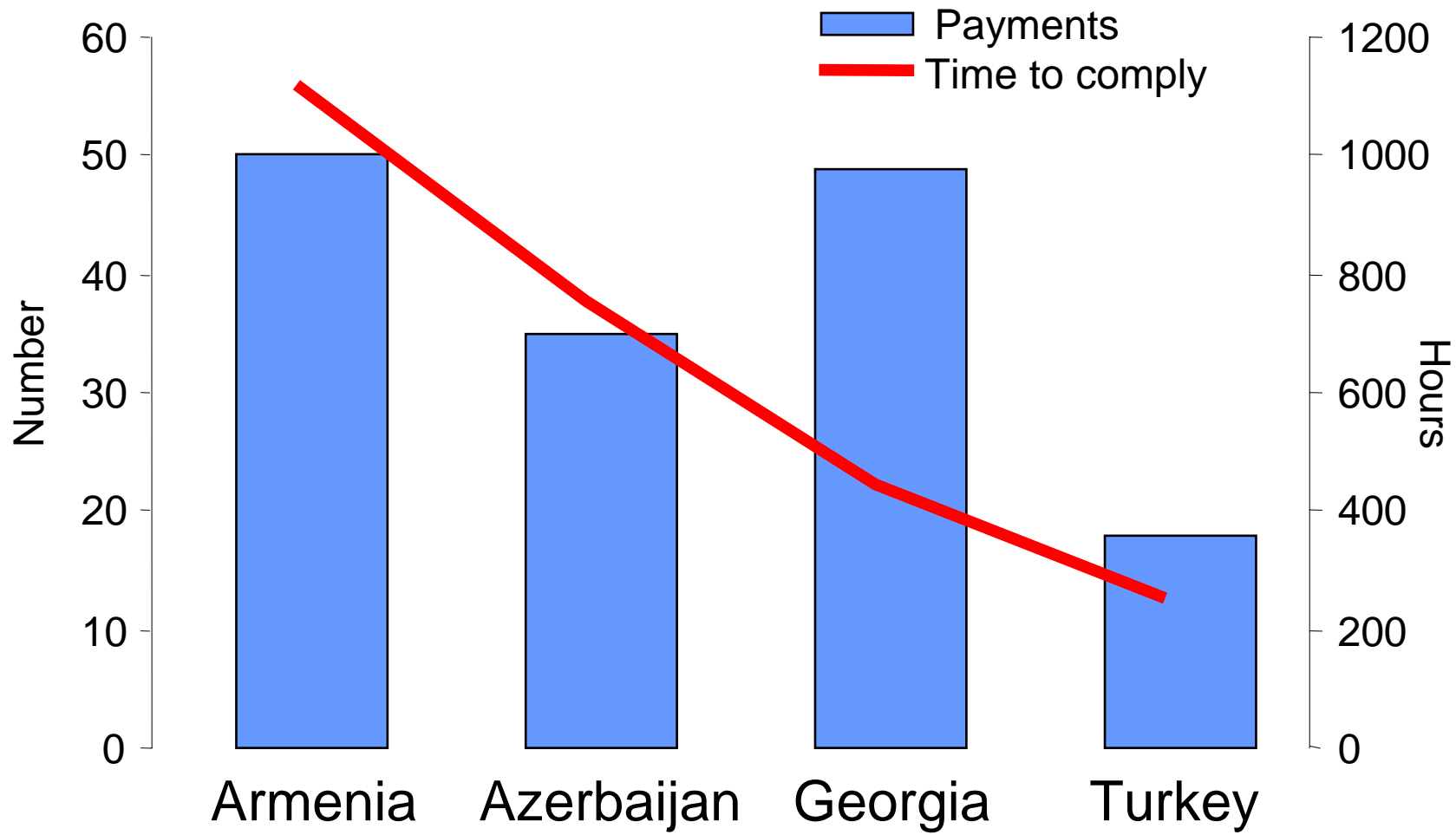
Percentage of firms rating each constraint a major obstacle

Tax rates

Percent of tax on gross profit

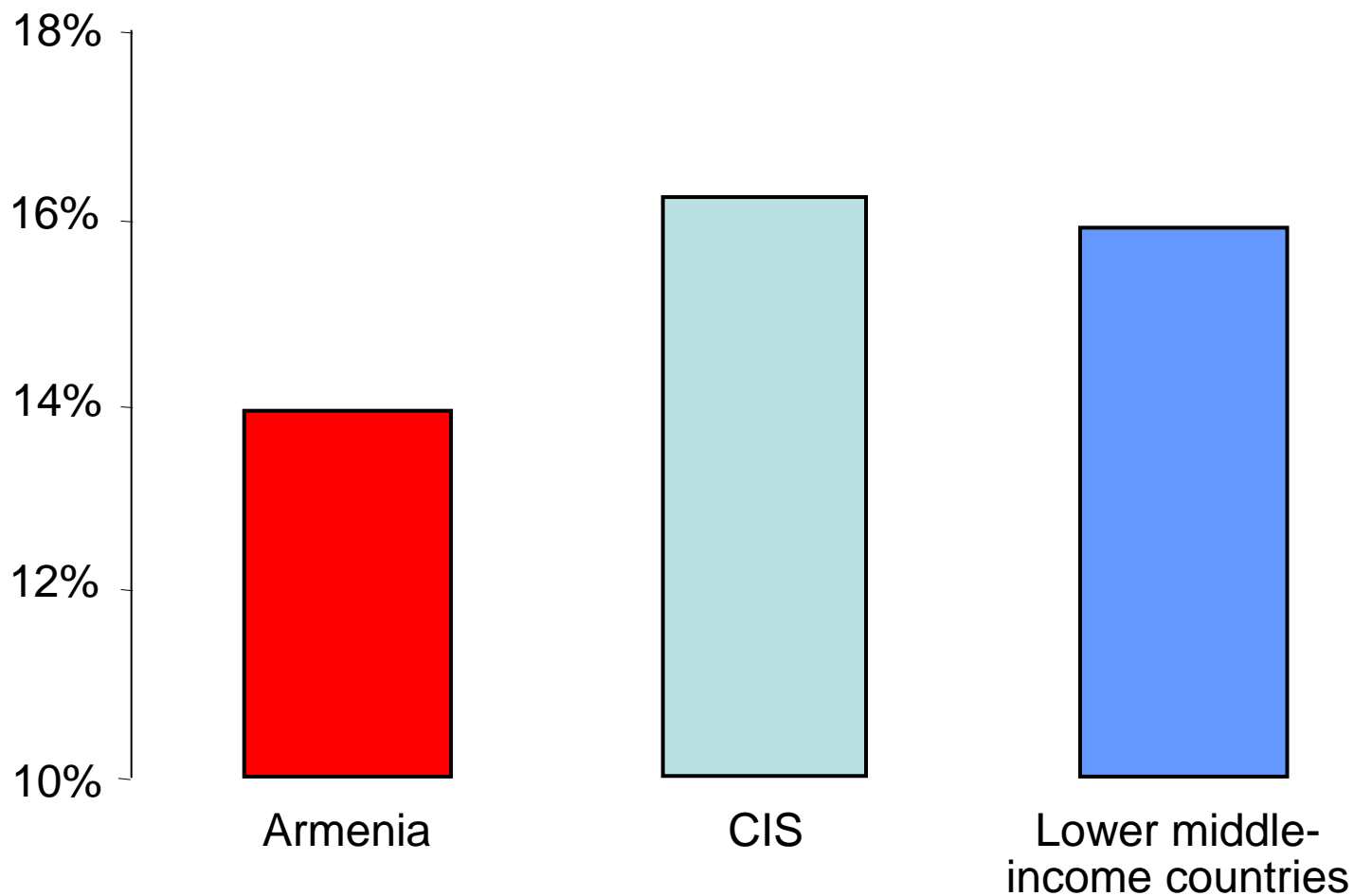


Tax administration: number of tax payments and time to comply with tax requirements



Tax collection

Tax revenues as a share of GDP

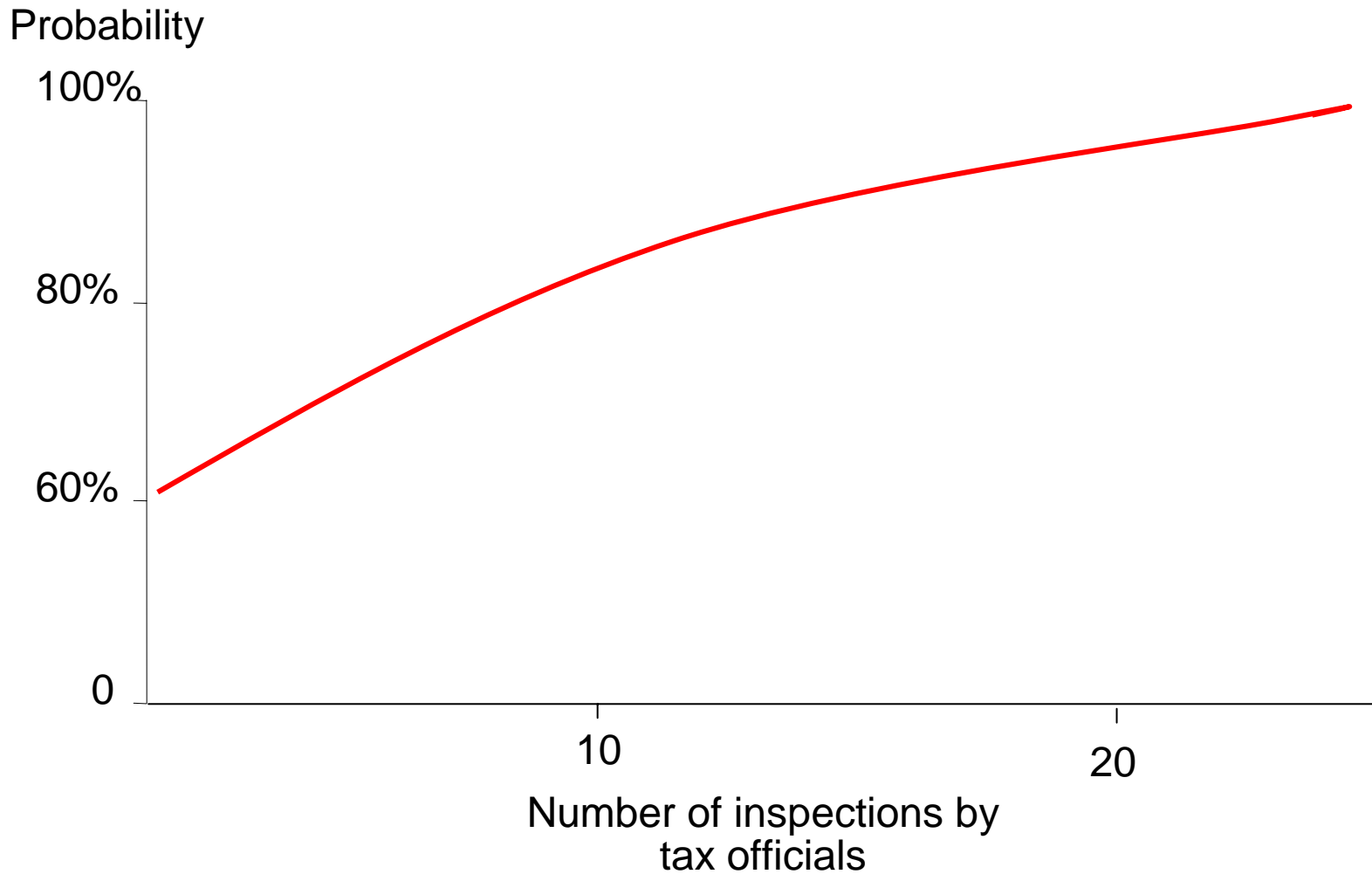


Source: Davoodi and Grigorian (2005)

Linear model between tax evasion and number of inspections

$$Evasion_i = \beta_0 + \beta_1 Inspections_i + e$$

Probability of perceiving corruption as a constraint



Linear model between tax evasion and number of inspections

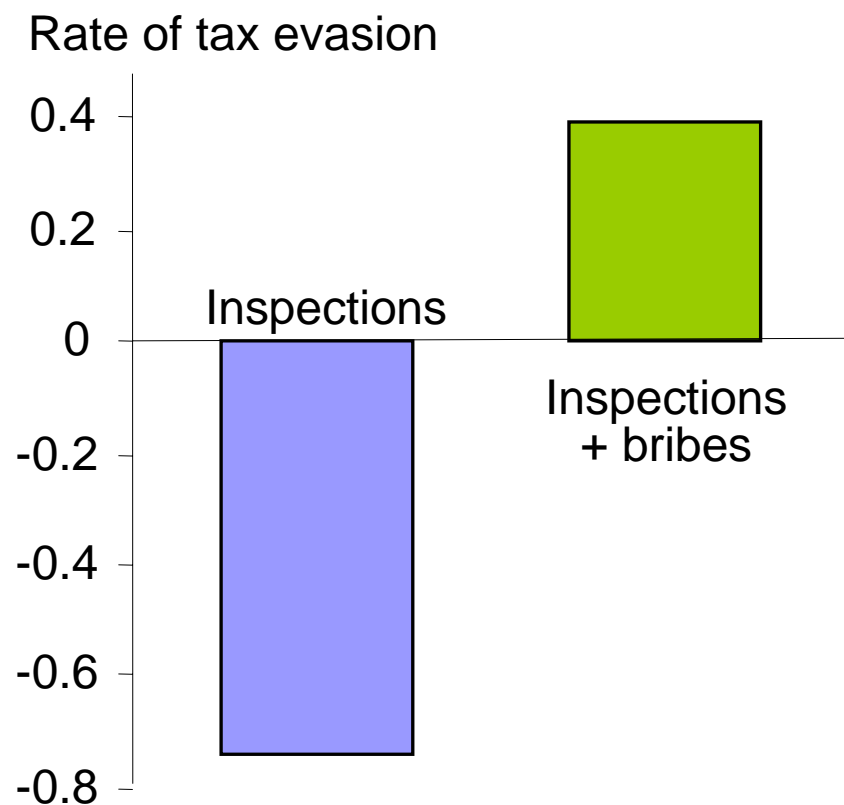
$$Evasion_i = \beta_0 + \beta_1 Inspections_i + e$$

$$\partial Evasion / \partial Inspection = \beta_1$$

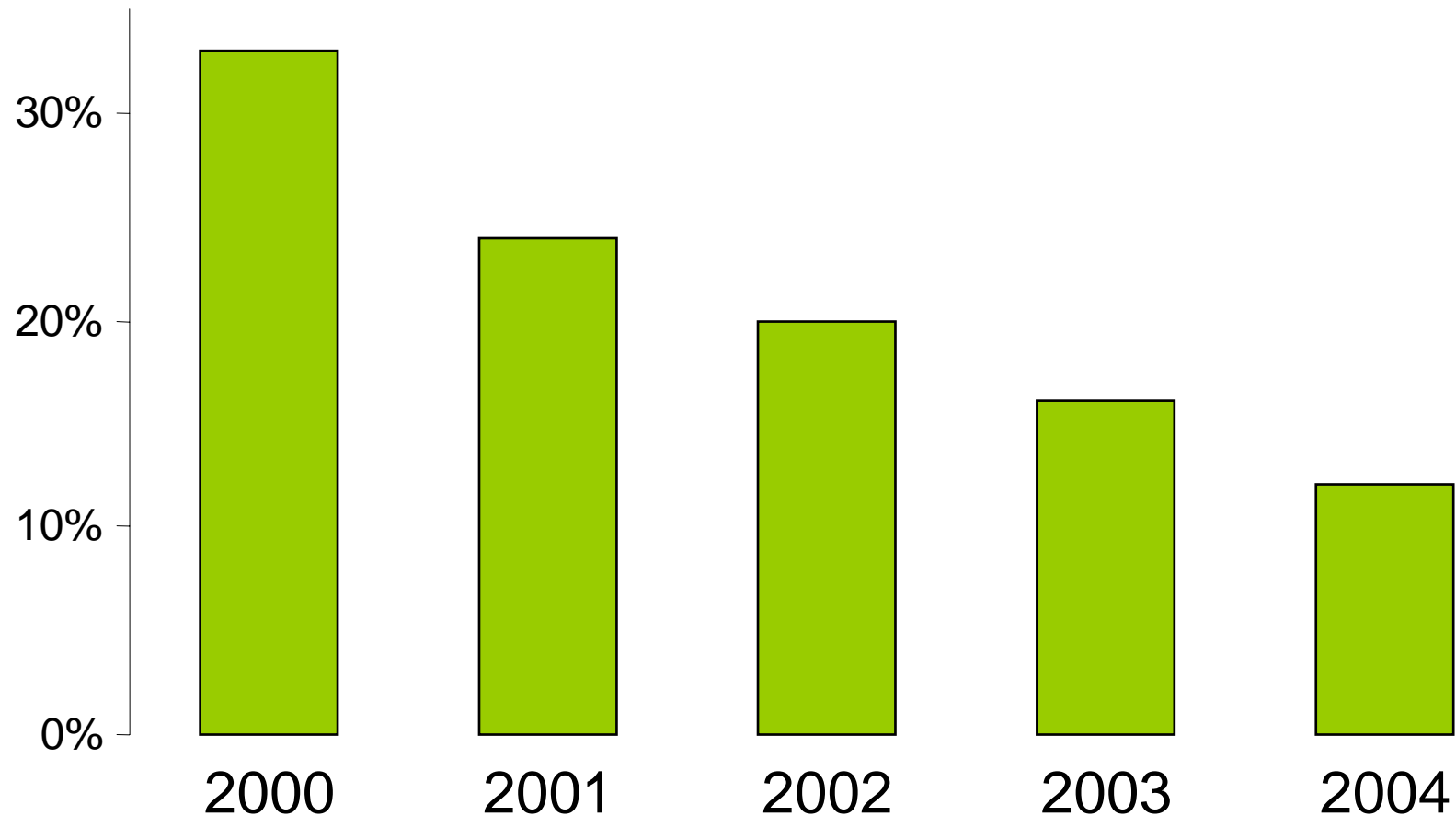
$$\beta_1 = \alpha_0 + \alpha_1 * Gifttax + u$$

$$Evasion_i = \beta_0 + \alpha_0 Inspections + \alpha_1 * Gifttax * Inspections + \varepsilon$$

Impact of corruption on tax evasion

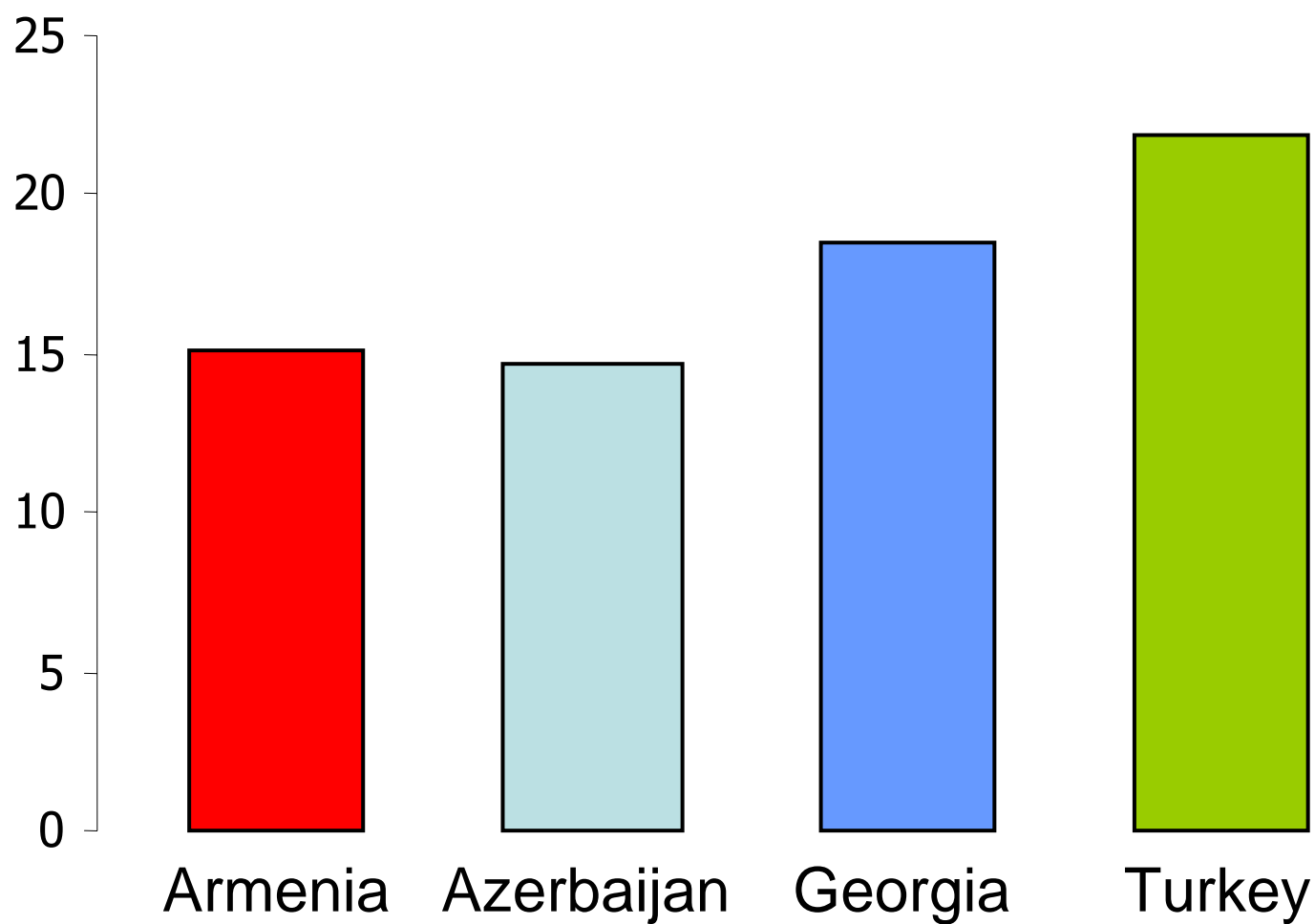


Cost of finance: Real interest rate in Armenia



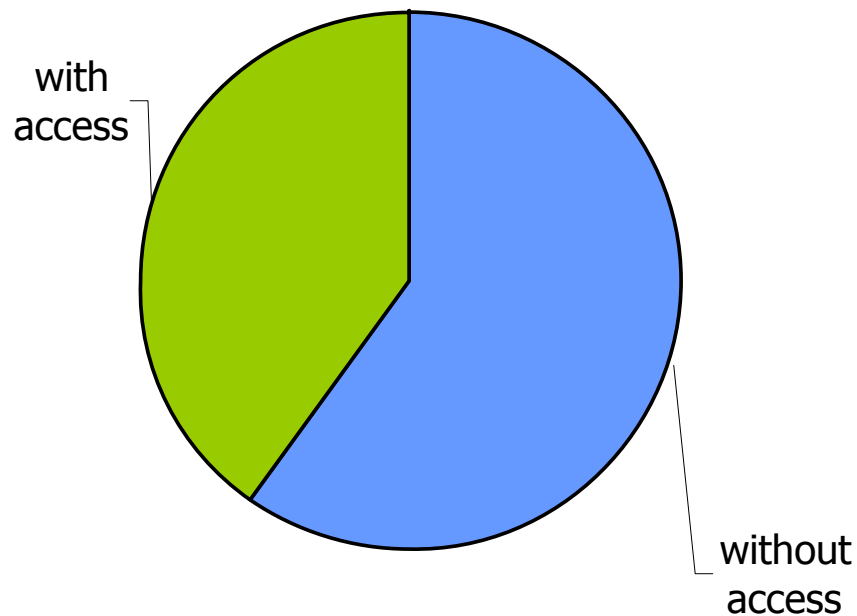
Source: IMF, International Financial Statistics

Nominal interest rate on firm loans

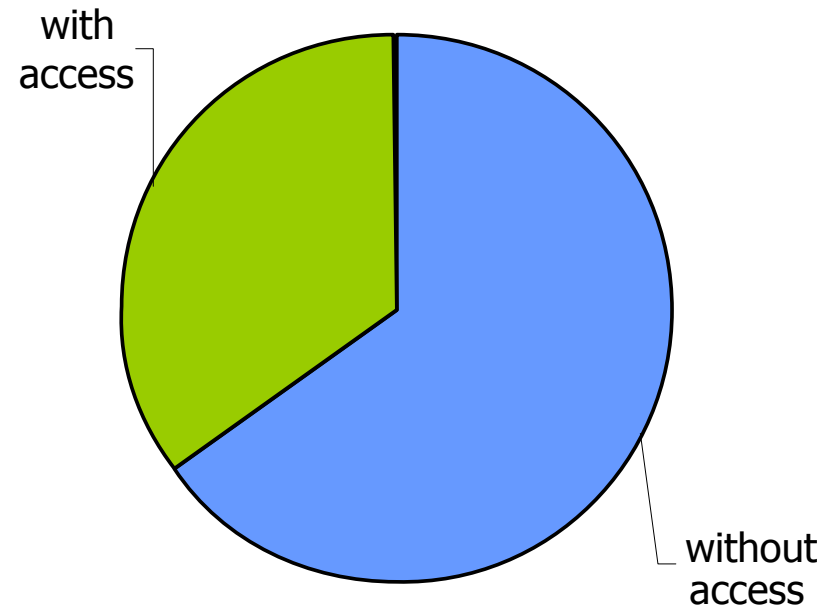


Access to finance: Share of firms with access to bank financing

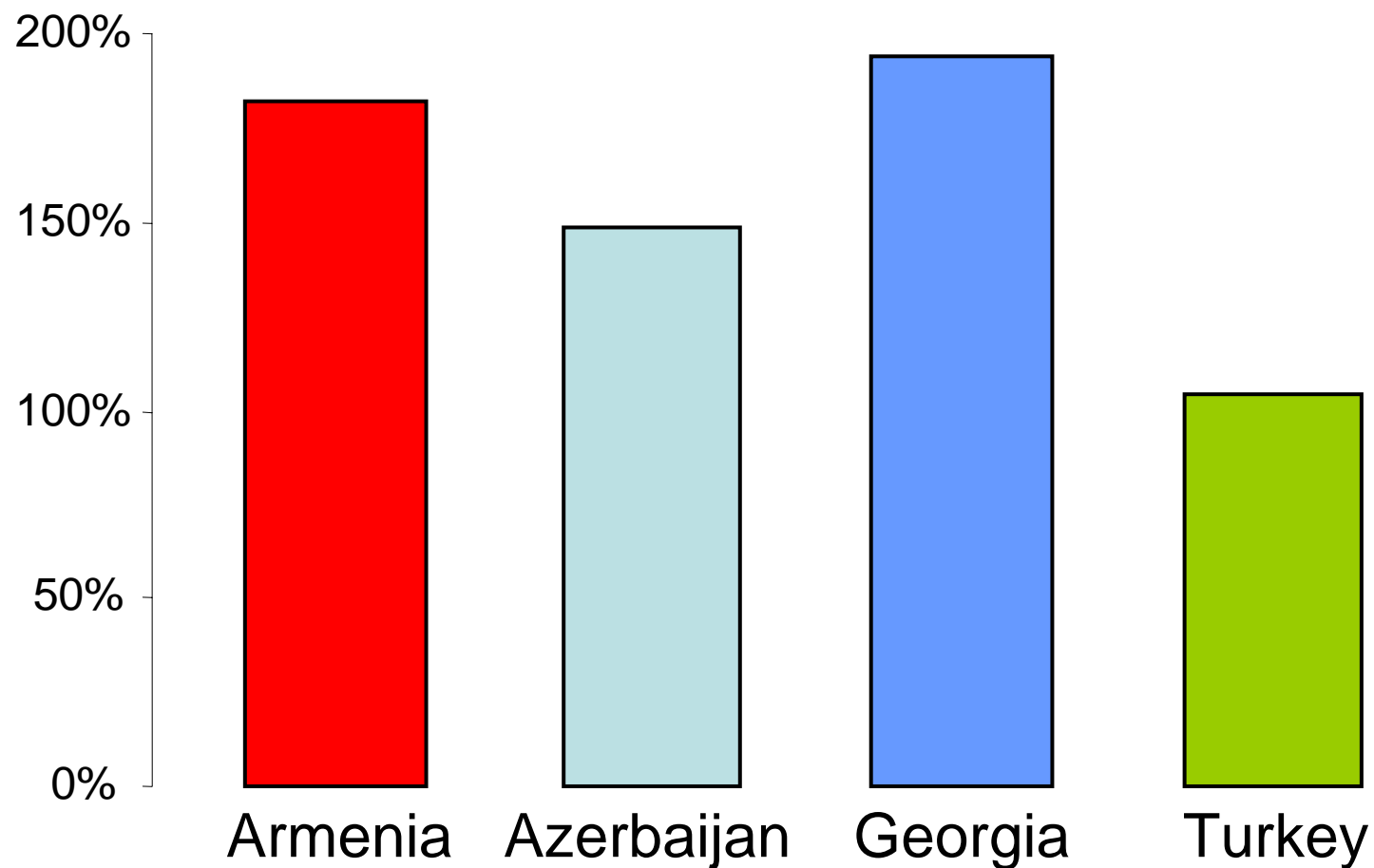
Short term financing



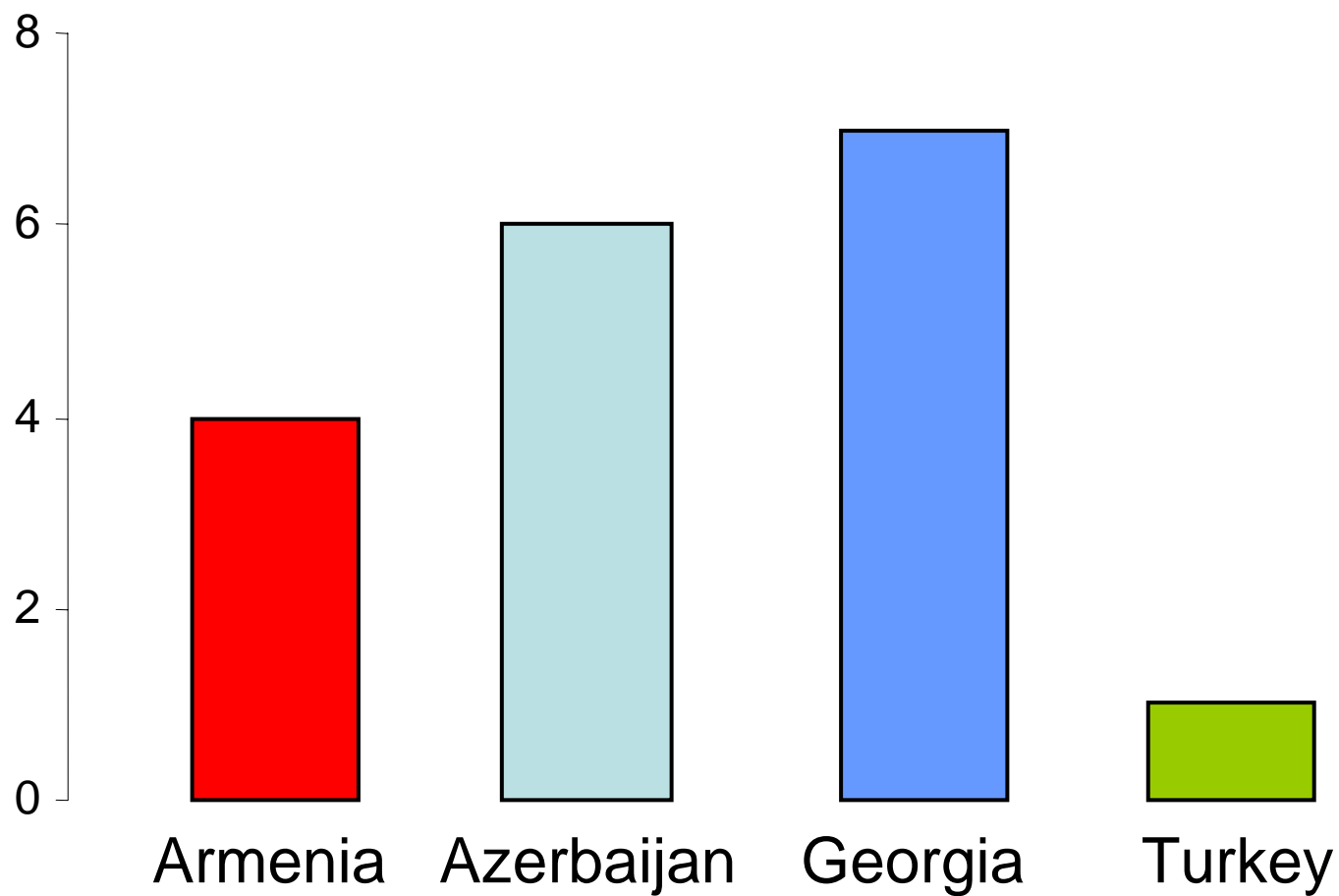
Long term financing



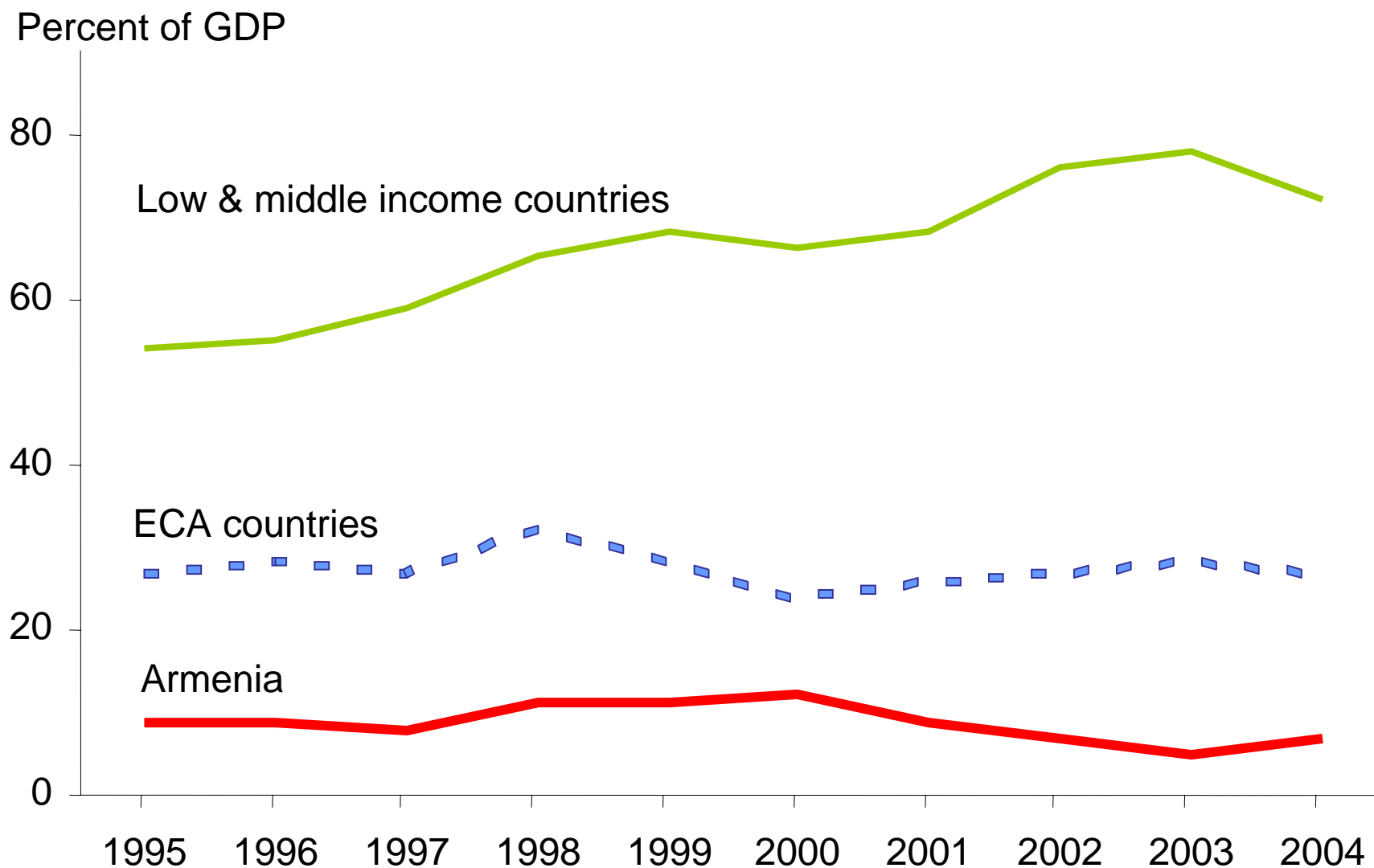
Amount of collateral on loans



Legal Rights Index



Credit provided by the banking sector



Conclusions

- Access to finance, red tape, and corruption are the 3 most important investment climate constraints for firms in Armenia

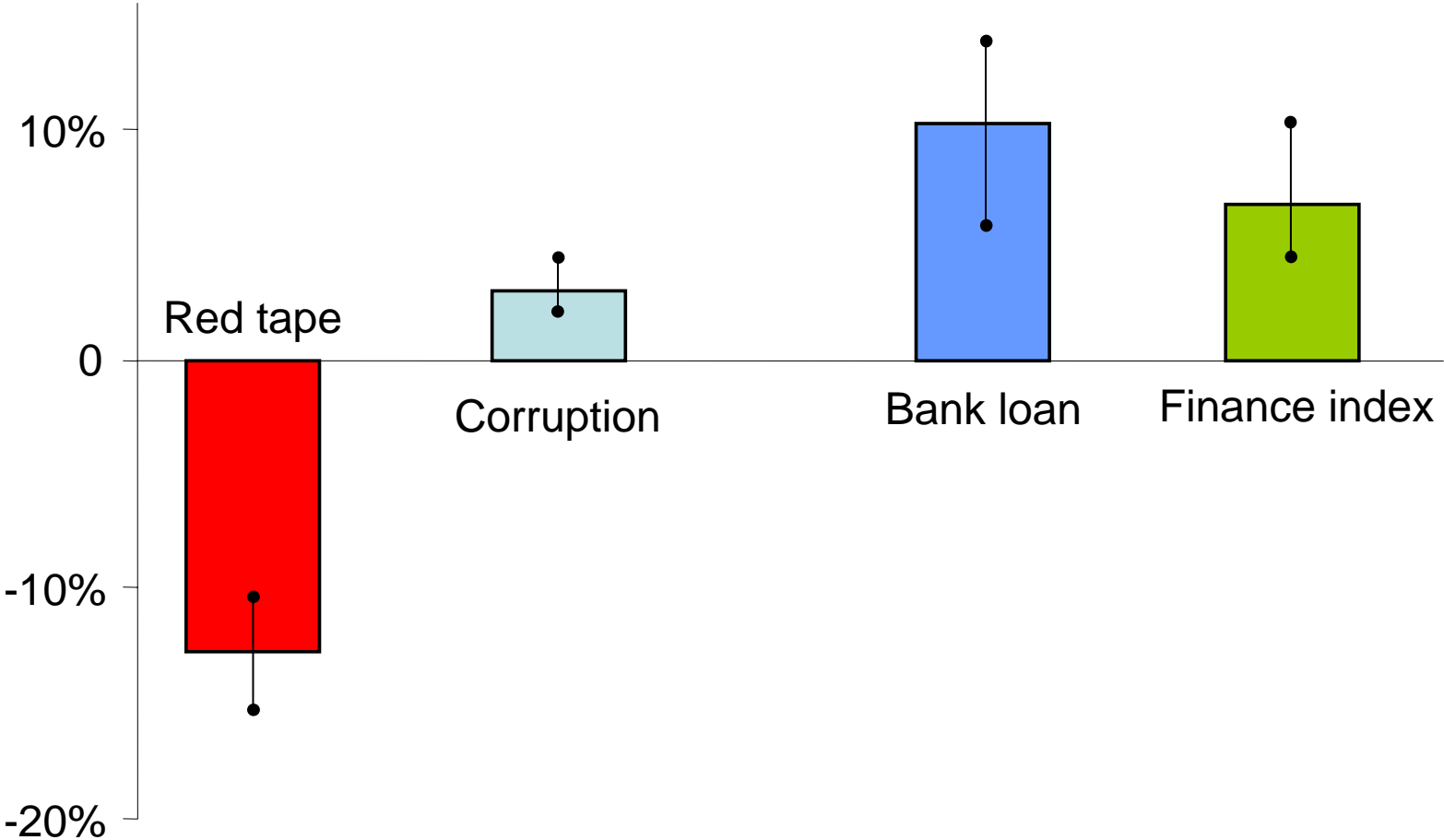
Escribano-augmented Cobb-Douglas production function

$$\ln(VA_i) = \beta_0 + \beta_l \ln(L_i) + \beta_k \ln(K_i) + \beta_e Escr_i + \sum_{n=1}^{n-1} \beta_n D_n + \varepsilon_i$$

$$TFP_i = \alpha_0 + \alpha_1 IC_i + \alpha_2 FC_i + \eta_i$$

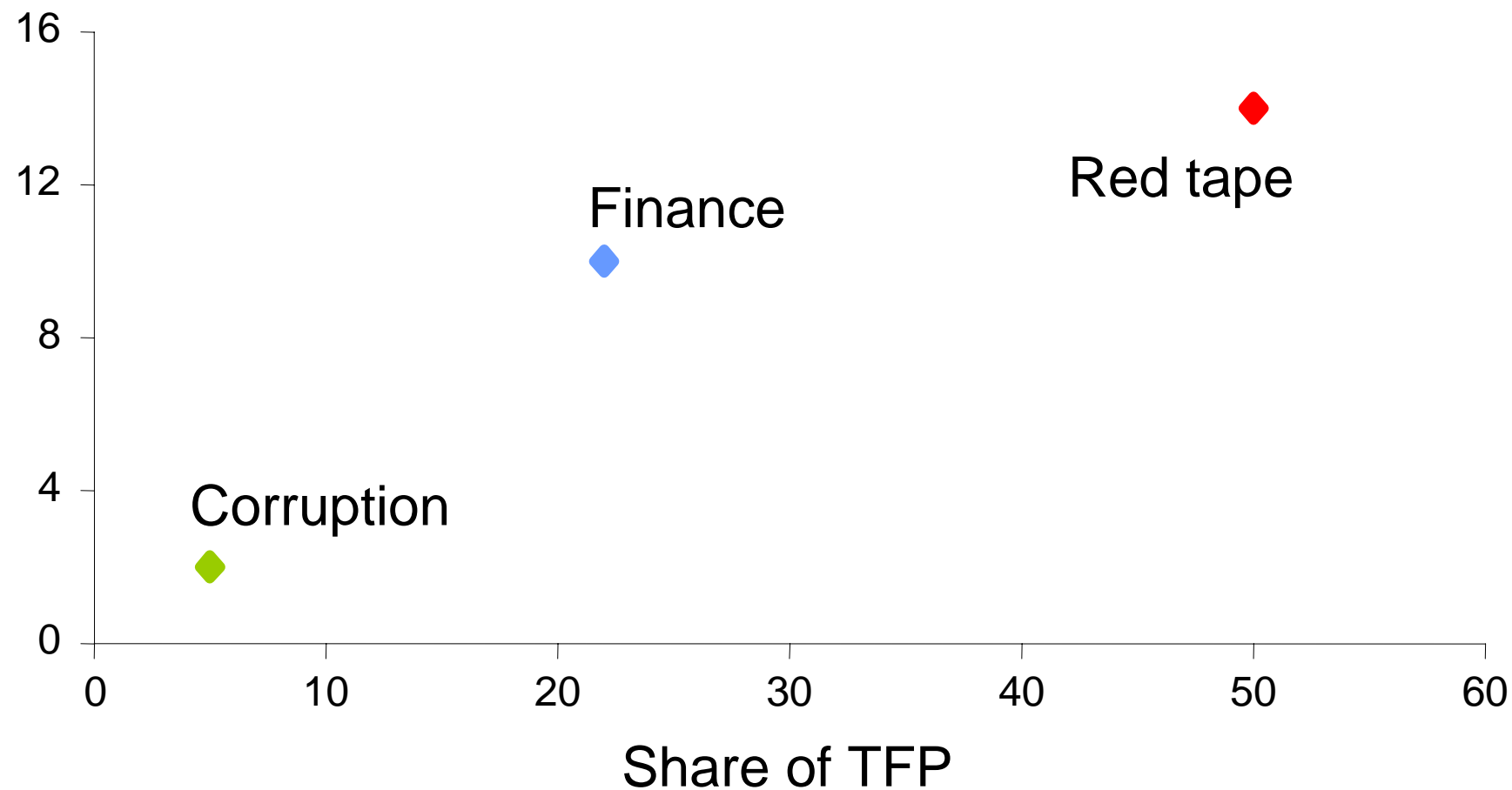
Firm productivity

Impact on firm productivity

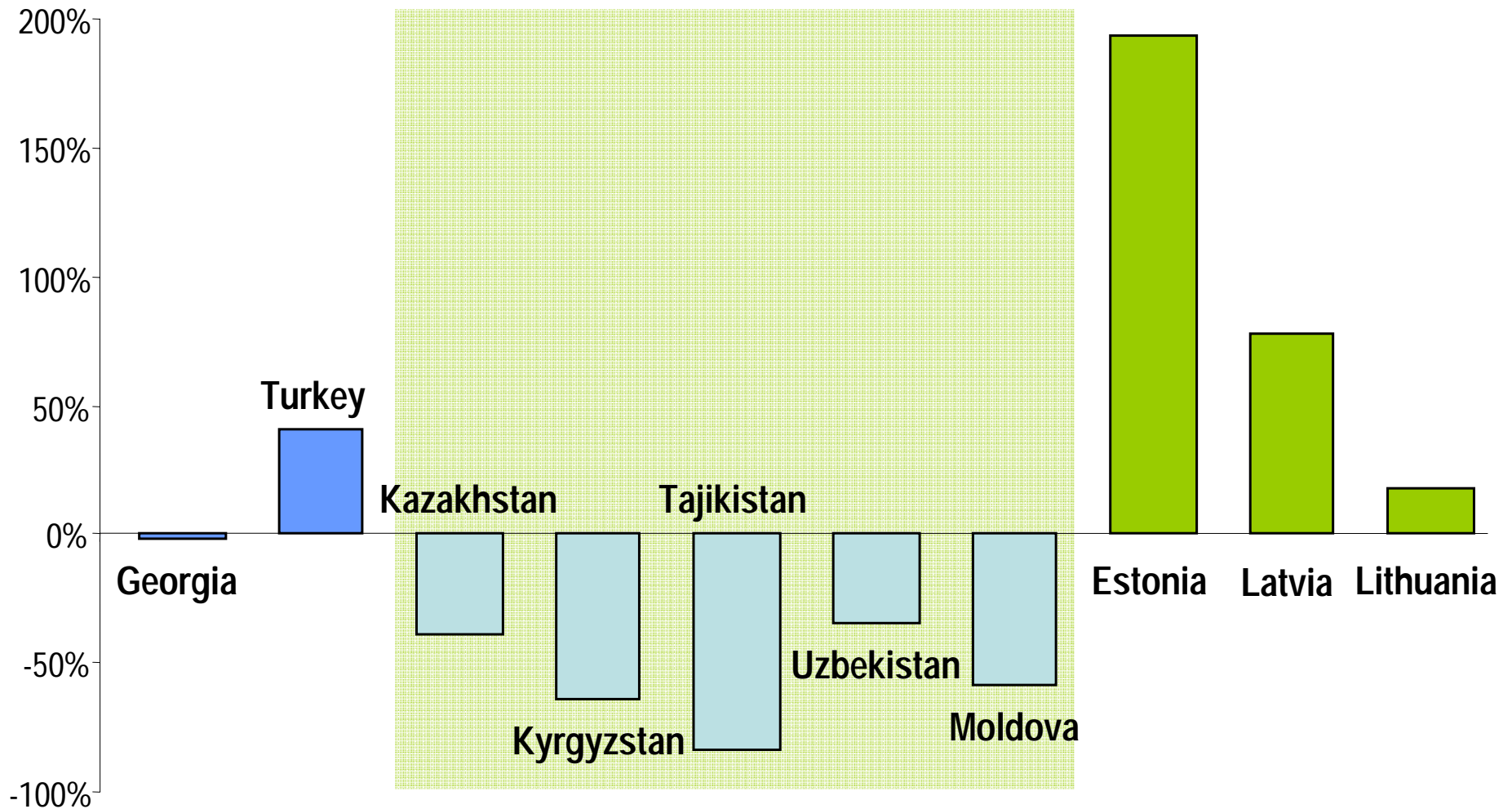


Priority of reforms

Marginal impact on firm productivity



Armenia's productivity gap with selected countries, 2005



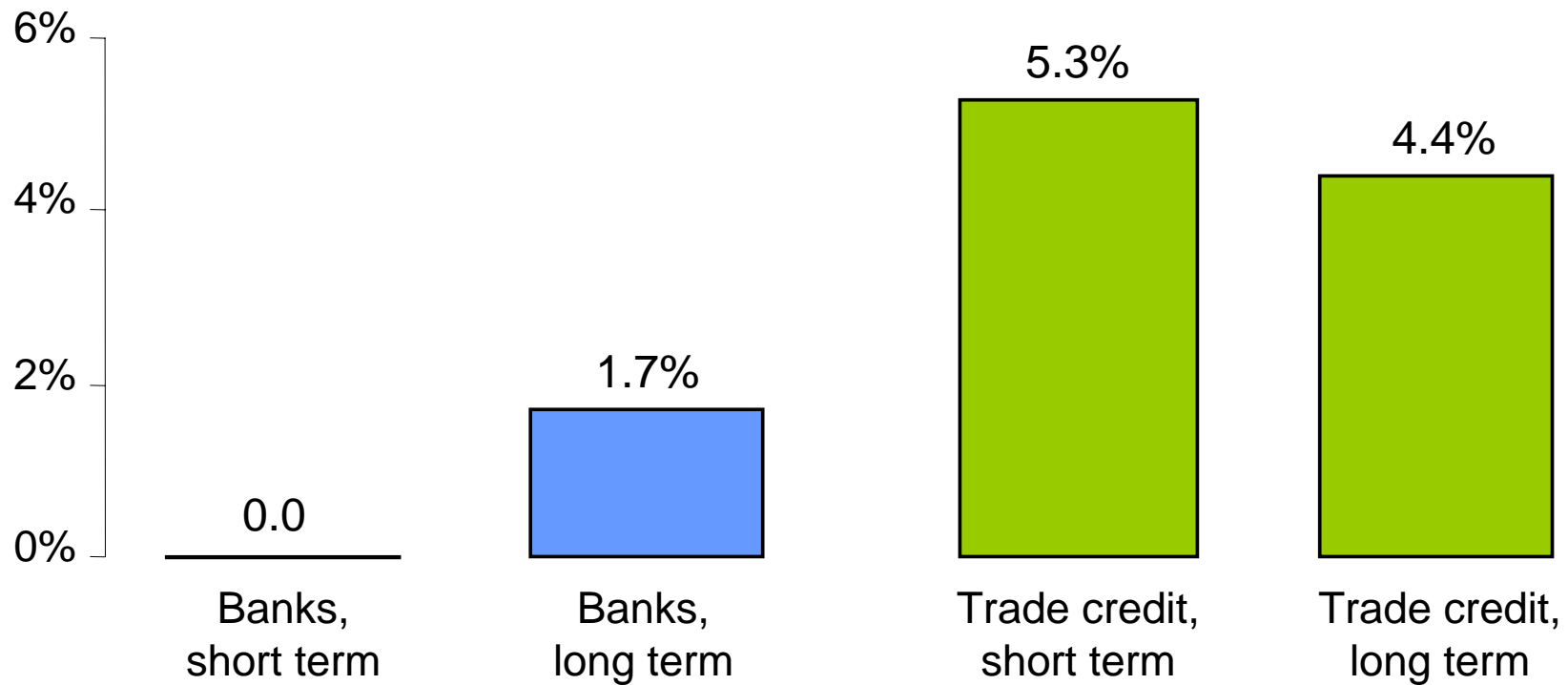
Estimating the productivity gap

$$TFP_i = \gamma_0 + \gamma_1 * IC_i + \gamma_2 * CountryD_i + \gamma_3 * IC_i * CountryD + \varepsilon$$

Impact of Investment Climate variables on Armenia's competitiveness compared to Turkey

	TFP (1)	TFP (2)	TFP (3)
Armenia (dummy)	-0.698 (1.70)*	-0.795 (1.09)	-0.622 (2.29)**
Red tape	-0.005 (0.06)		
Armenia*Red tape	0.030 (0.40)		
loan		-0.760 (1.05)	
Armenia*loan		0.394 (0.51)	
Corruption			-0.097 (0.94)
Armenia*Corrupt			0.047 (0.44)

Incremental impact on Armenia's productivity, over Turkey's



Conclusions

- Political influence in economic activity is the main factor driving the deterioration of the business climate in Armenia in the last 3 years.
- Red tape, access to finance and corruption are the major business obstacles to private sector development in Armenia.
- Red tape is the top Investment Climate constraint affecting firm performance in Armenia.
- Better access to long term finance, both in terms of bank lending and trade credit, would help bridge the 40% productivity gap with Turkey.