

Notes on
The Chinn-Ito Financial Openness Index
2016 Update

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The Chinn-Ito index (*KAOPEN*) is an index measuring a country's degree of capital account openness. The index was initially introduced in Chinn and Ito (*Journal of Development Economics*, 2006). *KAOPEN* is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*. This update is based on *AREAER 2017*, which contains the information on regulatory restrictions on cross-border financial transactions as of the end of 2016.¹

More information on how the index is constructed and how it compares with other measures of cross-border financial flows can be found in:

[“A New Measure of Financial Openness”](#), *Journal of Comparative Policy Analysis*, Volume 10, Issue 3 September 2008, p. 309 - 322. Note that this paper uses the 2007 version of the dataset (containing data up to only 2005), which will differ from the current version of the dataset.

When you use the index, please acknowledge the following paper as the data source:

Chinn, Menzie D. and Hiro Ito. 2006. [“What Matters for Financial Development? Capital Controls, Institutions, and Interactions.”](#) *Journal of Development Economics*, Volume 81, Issue 1, Pages 163-192 (October).

The dataset is available at http://web.pdx.edu/~ito/Chinn-Ito_website.htm .

kaopen_2016.xlsx (Excel format) or *kaopen_2016.dta* (STATA 13 dataset format) is a data file that contains the updated version of the Chinn and Ito index series. The dataset encompasses the time period of **1970-2016** for **182 countries**. In the dataset, *cn* refers to IMF-World Bank three-

¹ Not all the countries report their regulatory controls as of the end of the year of concern. For each country, the report stipulates the date as of which the data are based.

digit code; *ccode* to “ISO Alpha-3 Code”; *kaopen* to the Chinn-Ito index; and *ka_open* to the Chinn-Ito index normalized to range between zero and one. A complete list of the countries and their data availability are presented in the *Country List* shown below.

Regarding KAOPEN

As is explained with details in Chinn and Ito (2006, 2008), *KAOPEN* is the first principal component of the original variables pertaining to regulatory controls over current or capital account transactions, the existence of multiple exchange rates, and the requirements of surrendering export proceeds. For more details, refer to Chinn and Ito (2006, 2008).

Principal component analysis (PCA) is a statistical tool that extracts principal components (PCs), which are orthogonal linear combinations of a set of variables based on their ability to capture the variations of these variables. The first PC covers the greatest variance of the original variables: (i.e., *k1*, *k2*, *Share_k3*, and *k4*). In the process of constructing PCs, the original variables are standardized, which makes the mean of the PC zero, i.e., make the PC range between negative and positive territories. See Anderson (2003) and other standard statistics textbooks for additional discussions of PCA.

By the nature of the principal component, every time the data are updated to include the most recent year’s data, the index is recalculated using the *entire* sample of the original variables, including corrected/fixed data. Because of this procedure, the data for the older years are recalculated, and the *KAOPEN* index becomes incompatible across different versions. Hence, the summary statistics change across different versions of the index.

What’s new?

- *KAOPEN* is updated for 2016 using the “Summary Features of Exchange Arrangements and Regulatory Frameworks for Current and Capital Transactions in IMF Member Countries” included in *AREAER 2017*.
- It appears that the international sanctions against terrorist states have made some countries, especially industrialized countries, start reporting implementations of capital controls from 2005 on. Hence, in the *AREAER*, the following countries appear as though they “imposed” capital controls since 2005. However, given the nature of the “capital controls” and also given the lack of perception or evidence that these countries did actually implement capital controls in economically meaningful ways, we decided to consider that these countries did not impose capital controls from 2005 on. Specifically, the original *k3* is given the value of zero for the following countries, except for France and Japan which appear to have imposed “international sanctions” through *k2* restrictions from 2006 on.

The countries of our concern here are:²

United States (111), Austria (122), Belgium (124), France (132), Germany (134), Sweden (144), Switzerland (146), Japan (158), Finland (172), Greece (174), Portugal (182), Spain (184), Czech Rep. (935), and Hungary (944).

- The variables of *KAOPEN*, *k1*, *k2*, *k3*, and *k4* are replaced with missing variables for the following countries and years because of the lack of functioning governments and financial markets.

Afghanistan in 2001 to present

Iraq in 2003 to present

Somalia in 2008 to present

Summary Statistics of *KAOPEN*

The summary statistics of *KAOPEN* for different income groups are shown in Table 1.

Figure 1 compares the subsample averages of *KAOPEN* for different income groups of countries.³ Figure 2 does the same thing, but in terms of ratios with the maximal value normalized as 1.00 (i.e., *ka_open*) for different income groups and decades. Figure 3 compares the ratios of *KAOPEN* for developing countries across different geographical regions.

Table 2 ranks countries based on the level of *KAOPEN* as of 2016. The furthest right column indicates whether a country of concern increased (“Up”) or decreased (“Down”) the level of *KAOPEN* compared to that as of 2016. There are 54 countries that score the “most financially open” value of 2.36 as of 2016 whereas there are 12 countries with the “least financial open” score of -1.91.

Table 3 reports that 10 countries increased the level of *KAOPEN* in 2016 while 7 countries decreased the level of *KAOPEN* the same year.

Figure 4 compares the averages of annual changes in *KAOPEN* (i.e., the first-differenced change in the normalized *KAOPEN*) for different time periods and different income groups. Figure 5 does the same thing for different geographical groups of developing countries.

² The figure in parentheses denotes the IMF-World Bank three-digit code. The same is true for the remainder of the paper.

³ The industrialized countries (IDC) refer to traditional OECD countries, leaving the other countries as the developing countries (LDC). The emerging market countries (EMGs), a subgroup of LDC, are defined as the countries classified as either emerging or frontier during the period of 1980-1997 by the International Financial Corporation plus Hong Kong and Singapore. In the country list shown in Appendix I, IDCs and EMGs are denoted by “i” and “e”, respectively.

Notes

The dataset is available at http://web.pdx.edu/~ito/Chinn-Ito_website.htm .

The document [“A New Measure of Financial Openness”](#) details the construction of the index and other relevant information. Please consult with that document before sending inquiries to ito@pdx.edu.

The IMF’s *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* of 2010 has a survey of the literature on various measures of capital account restrictiveness in Appendix to Introduction (p. 48–53).

Next Update: The index might be updated in the spring of 2019, following the publication of the IMF’s *AREAER 2018* (probably in the winter of 2018-19) which will contain information on capital controls policies as of 2017. The release of the update may change due to a variety of reasons. Please check http://web.pdx.edu/~ito/Chinn-Ito_website.htm before sending us inquiries.

Disclaimer: When you use the index, please acknowledge our *JDE* paper (see below) as the data source. We are not responsible for the results of the estimations that use the index. Although the index is based on the information released by the International Monetary Fund, the index is not associated with the Fund. All the errors of the index are the authors’ own. All rights reserved.

References

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- International Monetary Fund (2010, various years). *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*, Washington, D.C.: International Monetary Fund.

Appendix I: Country List

	cn	ccode	Country Name	Availability			cn	ccode	Country Name	Availability			
1	512	AFG	Afghanistan	1970	-	2000	30	622	CMR	Cameroon	1970	-	2016
2	914	ALB	Albania	1995	-	2016	31	156	CAN	Canada (i)	1970	-	2016
3	612	DZA	Algeria	1970	-	2016	32	624	CPV	Cape Verde	1982	-	2016
4	614	AGO	Angola	1993	-	2016	33	626	CAF	Central African Republic	1970	-	2016
5	311	ATG	Antigua and Barbuda	1985	-	2009	34	628	TCD	Chad	1970	-	2016
6	213	ARG	Argentina (e)	1970	-	2016	35	228	CHL	Chile (e)	1970	-	2016
7	911	ARM	Armenia	1996	-	2016	36	924	CHN	China (e)	1984	-	2016
8	314	ABW	Aruba	1992	-	2016	37	233	COL	Colombia (e)	1970	-	2016
9	193	AUS	Australia (i)	1970	-	2016	38	632	COM	Comoros	1981	-	2016
10	122	AUT	Austria (i)	1970	-	2016	39	636	ZAR	Congo, Dem. Rep.	1970	-	2012
11	912	AZE	Azerbaijan	1996	-	2016	40	634	COG	Congo, Rep.	1970	-	2016
12	313	BHS	Bahamas, The	1977	-	2016	41	238	CRI	Costa Rica	1970	-	2016
13	419	BHR	Bahrain	1976	-	2016	42	960	HRV	Croatia	1996	-	2016
14	513	BGD	Bangladesh (e)	1976	-	2016	43	423	CYP	Cyprus	1970	-	2016
15	316	BRB	Barbados	1974	-	2016	44	935	CZE	Czech Republic (e)	1996	-	2016
16	913	BLR	Belarus	1996	-	2016	45	128	DNK	Denmark (i)	1970	-	2016
17	124	BEL	Belgium (i)	1970	-	2016	46	611	DJI	Djibouti	1982	-	2016
18	339	BLZ	Belize	1985	-	2016	47	321	DMA	Dominica	1982	-	2016
19	638	BEN	Benin	1979	-	2016	48	243	DOM	Dominican Republic	1970	-	2016
20	514	BTN	Bhutan	1985	-	2016	49	248	ECU	Ecuador (e)	1970	-	2016
21	218	BOL	Bolivia	1970	-	2016	50	469	EGY	Egypt (e)	1970	-	2016
22	963	BIH	Bosnia and Herzegovina	1999	-	2016	51	253	SLV	El Salvador	1970	-	2016
23	616	BWA	Botswana (e)	1972	-	2016	52	642	GNQ	Equatorial Guinea	1973	-	2016
24	223	BRA	Brazil (e)	1970	-	2016	53	643	ERI	Eritrea	1998	-	2016
25	918	BGR	Bulgaria (e)	1994	-	2016	54	939	EST	Estonia	1996	-	2016
26	748	BFA	Burkina Faso	1988	-	2016	55	644	ETH	Ethiopia	1970	-	2016
27	618	BDI	Burundi	1970	-	2016	56	819	FJI	Fiji	1975	-	2016
28	662	CIV	Côte d'Ivoire (e)	1970	-	2016	57	172	FIN	Finland (i)	1970	-	2016
29	522	KHM	Cambodia	1973	-	2016	58	132	FRA	France (i)	1970	-	2016
							59	646	GAB	Gabon	1970	-	2016
							60	648	GMB	Gambia, The	1971	-	2016

	cn	ccode	Country Name	Availability				cn	ccode	Country Name	Availability		
61	915	GEO	Georgia	1996	-	2016	92	941	LVA	Latvia	1996	-	2016
62	134	DEU	Germany (i)	1970	-	2016	93	446	LBN	Lebanon	1970	-	2016
63	652	GHA	Ghana (e)	1970	-	2016	94	666	LSO	Lesotho	1972	-	2016
64	174	GRC	Greece (i)	1970	-	2016	95	668	LBR	Liberia	1970	-	2016
65	328	GRD	Grenada	1979	-	2016	96	672	LBY	Libya	1970	-	2016
66	258	GTM	Guatemala	1970	-	2016	97	946	LTU	Lithuania (e)	1996	-	2016
67	656	GIN	Guinea	1970	-	2016	98	962	MKD	Macedonia, FYR	1997	-	2016
68	654	GNB	Guinea-Bissau	1981	-	2016	99	674	MDG	Madagascar	1970	-	2016
69	336	GUY	Guyana	1970	-	2016	100	676	MWI	Malawi	1970	-	2016
70	263	HTI	Haiti	1970	-	2016	101	548	MYS	Malaysia (e)	1970	-	2016
71	268	HND	Honduras	1970	-	2016	102	556	MDV	Maldives	1982	-	2016
72	532	HKG	Hong Kong, China (e)	1970	-	2016	103	678	MLI	Mali	1970	-	2016
73	944	HUN	Hungary (e)	1986	-	2016	104	181	MLT	Malta (i)	1972	-	2016
74	176	ISL	Iceland (i)	1970	-	2016	105	867	MHL	Marshall Islands	1996	-	2016
75	534	IND	India (e)	1970	-	2016	106	682	MRT	Mauritania	1970	-	2016
76	536	IDN	Indonesia (e)	1970	-	2016	107	684	MUS	Mauritius (e)	1972	-	2016
77	429	IRN	Iran, Islamic Rep.	1970	-	2016	108	273	MEX	Mexico (e)	1970	-	2016
78	433	IRQ	Iraq	1970	-	2002	109	868	FSM	Micronesia, Fed. Sts.	1996	-	2016
79	178	IRL	Ireland (i)	1970	-	2016	110	921	MDA	Moldova	1996	-	2016
80	436	ISR	Israel (e)	1970	-	2016	111	948	MNG	Mongolia	1995	-	2016
81	136	ITA	Italy (i)	1970	-	2016	112	686	MAR	Morocco (e)	1970	-	2016
82	343	JAM	Jamaica (e)	1970	-	2016	113	688	MOZ	Mozambique	1988	-	2016
83	158	JPN	Japan (i)	1970	-	2016	114	518	MMR	Myanmar	1970	-	2016
84	439	JOR	Jordan (e)	1970	-	2016	115	728	NAM	Namibia	1994	-	2016
85	916	KAZ	Kazakhstan	1996	-	2016	116	558	NPL	Nepal	1970	-	2016
86	664	KEN	Kenya (e)	1970	-	2016	117	138	NLD	Netherlands (i)	1970	-	2016
87	826	KIR	Kiribati	1990	-	2005	118	353	ANT	Netherlands Antilles	1970	-	2009
88	542	KOR	Korea, Rep. (e)	1970	-	2016	119	196	NZL	New Zealand (i)	1970	-	2016
89	443	KWT	Kuwait	1970	-	2016	120	278	NIC	Nicaragua	1970	-	2016
90	917	KGZ	Kyrgyz Republic	1997	-	2016	121	692	NER	Niger	1970	-	2016
91	544	LAO	Lao PDR	1970	-	2016	122	694	NGA	Nigeria (e)	1970	-	2016

	cn	ccode	Country Name	Availability		
123	142	NOR	Norway (i)	1970	-	2016
124	449	OMN	Oman	1977	-	2016
125	564	PAK	Pakistan (e)	1970	-	2016
126	283	PAN	Panama	1970	-	2016
127	853	PNG	Papua New Guinea	1979	-	2016
128	288	PRY	Paraguay	1970	-	2016
129	293	PER	Peru (e)	1970	-	2016
130	566	PHL	Philippines (e)	1970	-	2016
131	964	POL	Poland (e)	1986	-	2016
132	182	PRT	Portugal (i)	1970	-	2016
133	453	QAT	Qatar	1976	-	2016
134	968	ROM	Romania	1976	-	2016
135	922	RUS	Russia (e)	1996	-	2016
136	714	RWA	Rwanda	1970	-	2016
137	716	STP	Sao Tome and Principe	1981	-	2016
138	862	WSM	Samoa	1975	-	2016
139	135	SMR	San Marino	1996	-	2016
140	456	SAU	Saudi Arabia	1970	-	2016
141	722	SEN	Senegal	1970	-	2016
142	718	SYC	Seychelles	1981	-	2016
143	724	SLE	Sierra Leone	1970	-	2016
144	576	SGP	Singapore (e)	1970	-	2016
145	936	SVK	Slovak Republic (e)	1996	-	2016
146	961	SVN	Slovenia (e)	1996	-	2016
147	813	SLB	Solomon Islands	1982	-	2016
148	726	SOM	Somalia	1970	-	2007
149	199	ZAF	South Africa (e)	1970	-	2016
150	184	ESP	Spain (i)	1970	-	2016
151	524	LKA	Sri Lanka (e)	1970	-	2016
152	361	KNA	St. Kitts and Nevis	1988	-	2016
153	362	LCA	St. Lucia	1983	-	2016

	cn	ccode	Country Name	Availability		
154	364	VCT	St. Vincent & the Grenad.	1983	-	2016
155	732	SDN	Sudan	1970	-	2016
156	366	SUR	Suriname	1970	-	2016
157	734	SWZ	Swaziland	1973	-	2016
158	144	SWE	Sweden (i)	1970	-	2016
159	146	CHE	Switzerland (i)	1996	-	2016
160	463	SYR	Syrian Arab Republic	1970	-	2016
161	923	TJK	Tajikistan	1997	-	2016
162	738	TZA	Tanzania	1970	-	2016
163	578	THA	Thailand (e)	1970	-	2016
164	742	TGO	Togo	1970	-	2016
165	866	TON	Tonga	1989	-	2016
166	369	TTO	Trinidad & Tobago (e)	1970	-	2016
167	744	TUN	Tunisia (e)	1970	-	2016
168	186	TUR	Turkey (e)	1970	-	2016
169	925	TKM	Turkmenistan	1996	-	2016
170	746	UGA	Uganda	1970	-	2016
171	926	UKR	Ukraine	1996	-	2016
172	466	ARE	United Arab Emirates	1976	-	2016
173	112	GBR	United Kingdom (i)	1970	-	2016
174	111	USA	United States (i)	1970	-	2016
175	298	URY	Uruguay	1970	-	2016
176	927	UZB	Uzbekistan	1996	-	2016
177	846	VUT	Vanuatu	1985	-	2000
178	299	VEN	Venezuela (e)	1970	-	2016
179	582	VNM	Vietnam	1970	-	2016
180	474	YEM	Yemen, Rep.	1995	-	2016
181	754	ZMB	Zambia	1970	-	2016
182	698	ZWE	Zimbabwe (e)	1984	-	2016

Notes: “cn” refers to IMF-World Bank three-digit code. “ccode” to “ISO Alpha-3 Code”. “(i)” and “(e)” refer to IDCs and EMGs, respectively.

Table 1: Summary Statistics (as of 2016)

	Minimum	Mean	Median	Maximum	Standard Deviation
Full Sample	-1.91	0.00	-0.14	2.36	1.53
Industrialized Countries	-1.91	1.31	2.36	2.36	1.34
Developing Countries	-1.91	-0.23	-1.20	2.36	1.44
Emerging Markets	-1.91	-0.18	-0.62	2.36	1.44

Table 2: Country Ranking as of 2016

Ranking	Country Name	KAOPEN	Change in KAOPEN	Ranking	Country Name	KAOPEN	Change in KAOPEN
1	Australia	2.36	Up	65	Chile	1.07	
1	Austria	2.36		65	Croatia	1.07	
1	Bahrain	2.36		65	Djibouti	1.07	
1	Belgium	2.36		65	Dominican Republic	1.07	Down
1	Botswana	2.36		65	Ecuador	1.07	
1	Bulgaria	2.36		65	El Salvador	1.07	
1	Cambodia	2.36	Up	65	Jamaica	1.07	
1	Canada	2.36		65	Kenya	1.07	
1	Costa Rica	2.36		65	Kuwait	1.07	
1	Czech Republic	2.36		65	Marshall Islands	1.07	
1	Denmark	2.36		65	Mauritius	1.07	
1	Estonia	2.36		65	Mexico	1.07	
1	Finland	2.36		65	Poland	1.07	
1	France	2.36		65	San Marino	1.07	
1	Gambia, The	2.36		65	Saudi Arabia	1.07	
1	Georgia	2.36		65	Slovenia	1.07	
1	Germany	2.36		81	Russian Federation	0.89	Down
1	Guatemala	2.36		82	Kyrgyz Republic	0.37	Up
1	Guyana	2.36		83	Azerbaijan	0.08	
1	Haiti	2.36		83	Papua New Guinea	0.08	Down
1	Hong Kong, China	2.36		85	Bolivia	0.01	
1	Hungary	2.36		85	Iceland	0.01	Up
1	Ireland	2.36		85	Lebanon	0.01	
1	Israel	2.36		85	Macedonia, FYR	0.01	
1	Italy	2.36		85	Paraguay	0.01	
1	Japan	2.36		85	Philippines	0.01	
1	Jordan	2.36		85	St. Lucia	0.01	
1	Korea, Rep.	2.36	Up	85	Tonga	0.01	
1	Latvia	2.36		85	Turkey	0.01	
1	Malta	2.36		94	Albania	-0.14	
1	Micronesia, Fed. Sts.	2.36		94	Colombia	-0.14	
1	Netherlands	2.36		94	Dominica	-0.14	
1	New Zealand	2.36		94	Indonesia	-0.14	
1	Nicaragua	2.36		94	Malaysia	-0.14	
1	Norway	2.36		94	Vietnam	-0.14	
1	Oman	2.36		94	Zimbabwe	-0.14	
1	Panama	2.36		101	Nigeria	-0.62	
1	Peru	2.36		101	Sudan	-0.62	
1	Portugal	2.36		103	Iran, Islamic Rep.	-0.70	
1	Qatar	2.36		104	Algeria	-1.20	
1	Romania	2.36		104	Argentina	-1.20	Up
1	Seychelles	2.36		104	Aruba	-1.20	
1	Singapore	2.36		104	Bangladesh	-1.20	
1	Spain	2.36		104	Barbados	-1.20	
1	Sweden	2.36		104	Belarus	-1.20	Up
1	Switzerland	2.36		104	Belize	-1.20	
1	Trinidad and Tobago	2.36		104	Benin	-1.20	
1	Uganda	2.36		104	Bhutan	-1.20	
1	United Arab Emirates	2.36		104	Bosnia and Herzegovina	-1.20	Down
1	United Kingdom	2.36		104	Brazil	-1.20	
1	United States	2.36		104	Burkina Faso	-1.20	
1	Uruguay	2.36		104	C?e d'Ivoire	-1.20	
1	Yemen, Rep.	2.36		104	Cameroon	-1.20	
1	Zambia	2.36		104	Cape Verde	-1.20	
55	Cyprus	1.85		104	Central African Republic	-1.20	
56	Armenia	1.65	Down	104	Chad	-1.20	
56	Maldives	1.65		104	China	-1.20	
56	Mongolia	1.65		104	Comoros	-1.20	
59	Lithuania	1.59	Up	104	Congo, Rep.	-1.20	
60	Greece	1.29		104	Egypt, Arab Rep.	-1.20	
60	Rwanda	1.29		104	Equatorial Guinea	-1.20	
60	Slovak Republic	1.29		104	Ethiopia	-1.20	
63	Liberia	1.15	Down	104	Fiji	-1.20	
63	Sao Tome and Principe	1.15		104	Gabon	-1.20	

Ranking	Country Name	KAOPEN	Change in KAOPEN
104	Grenada	-1.20	
104	Guinea-Bissau	-1.20	
104	Honduras	-1.20	
104	India	-1.20	
104	Kazakhstan	-1.20	
104	Lao PDR	-1.20	
104	Lesotho	-1.20	
104	Libya	-1.20	
104	Madagascar	-1.20	Down
104	Malawi	-1.20	
104	Mali	-1.20	
104	Mauritania	-1.20	
104	Moldova	-1.20	
104	Morocco	-1.20	
104	Mozambique	-1.20	
104	Namibia	-1.20	
104	Nepal	-1.20	
104	Niger	-1.20	
104	Pakistan	-1.20	
104	Samoa	-1.20	
104	Senegal	-1.20	
104	Sierra Leone	-1.20	Up
104	Solomon Islands	-1.20	
104	South Africa	-1.20	
104	Sri Lanka	-1.20	
104	St. Kitts and Nevis	-1.20	
104	St. Vincent and the Grenadines	-1.20	
104	Suriname	-1.20	Up
104	Swaziland	-1.20	
104	Tanzania	-1.20	
104	Thailand	-1.20	
104	Togo	-1.20	
104	Tunisia	-1.20	
104	Turkmenistan	-1.20	
163	Angola	-1.91	
163	Bahamas, The	-1.91	
163	Burundi	-1.91	
163	Eritrea	-1.91	
163	Ghana	-1.91	
163	Guinea	-1.91	
163	Myanmar	-1.91	
163	Syrian Arab Republic	-1.91	
163	Tajikistan	-1.91	
163	Ukraine	-1.91	
163	Uzbekistan	-1.91	
163	Venezuela, RB	-1.91	

Table 3: Countries that increased *KAOPEN* in 2016

	Ranking	Country Name	<i>KAOPEN</i> (as of 2016)	Change in <i>KAOPEN</i>
1	1	Cambodia	2.36	1.21
1	1	Korea, Rep.	2.36	1.21
1	85	Iceland	0.01	1.21
4	82	Kyrgyz Republic	0.37	1.07
5	104	Argentina	-1.20	0.71
5	104	Belarus	-1.20	0.71
5	104	Sierra Leone	-1.20	0.71
5	104	Suriname	-1.20	0.71
9	1	Australia	2.36	0.26
9	59	Lithuania	1.59	0.26

Table 4: Countries that decreased *KAOPEN* in 2016

	Ranking	Country Name	<i>KAOPEN</i> (as of 2016)	Change in <i>KAOPEN</i>
1	63	Liberia	1.15	-1.20904
1	83	Papua New Guinea	0.08	-1.20904
3	104	Madagascar	-1.20	-1.06685
4	56	Armenia	1.65	-0.70807
5	65	Dominican Republic	1.07	-0.25729
5	81	Russian Federation	0.89	-0.25729
5	104	Bosnia & Herzegovina	-1.20	-0.25729

Figure 1: Development of *KAOPEN* for Different Income Groups, 1970 – 2016

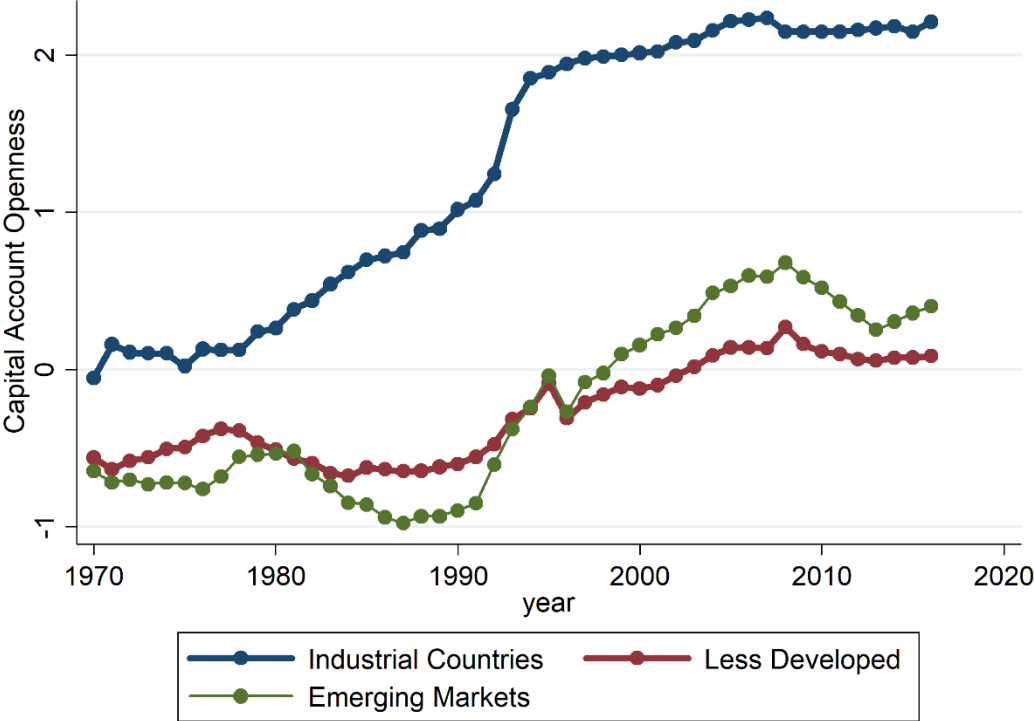
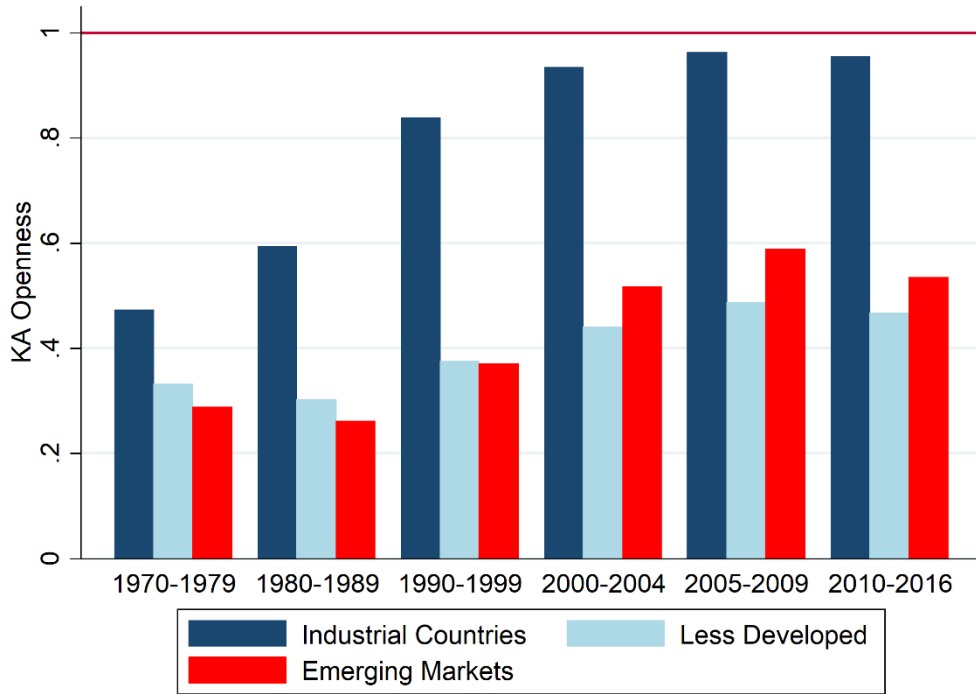
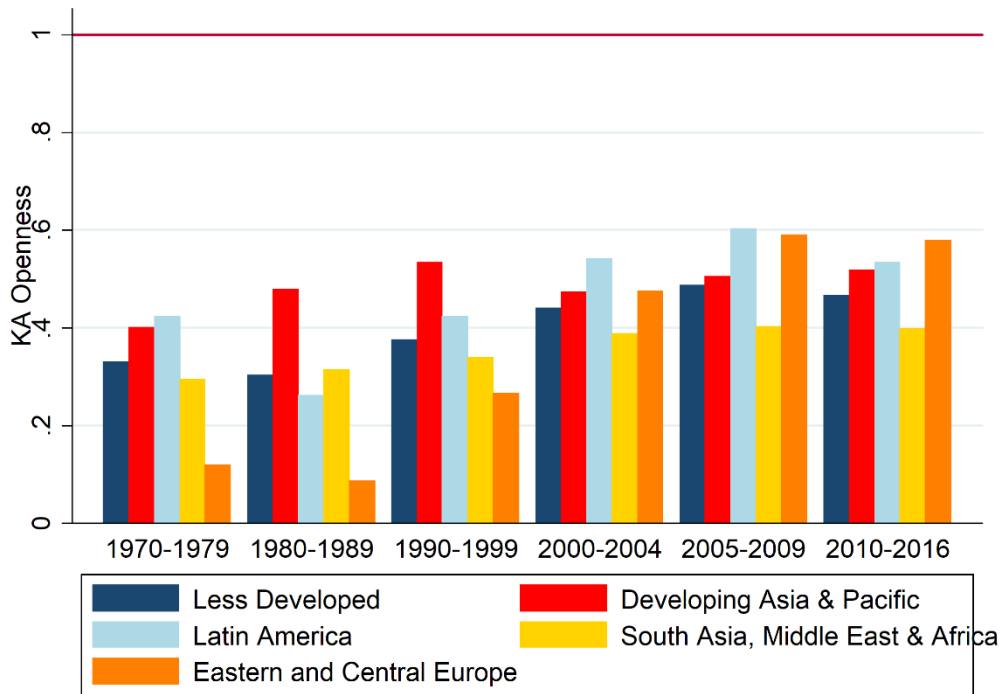


Figure 2: Comparison of *KAOPEN* across Different Income Groups



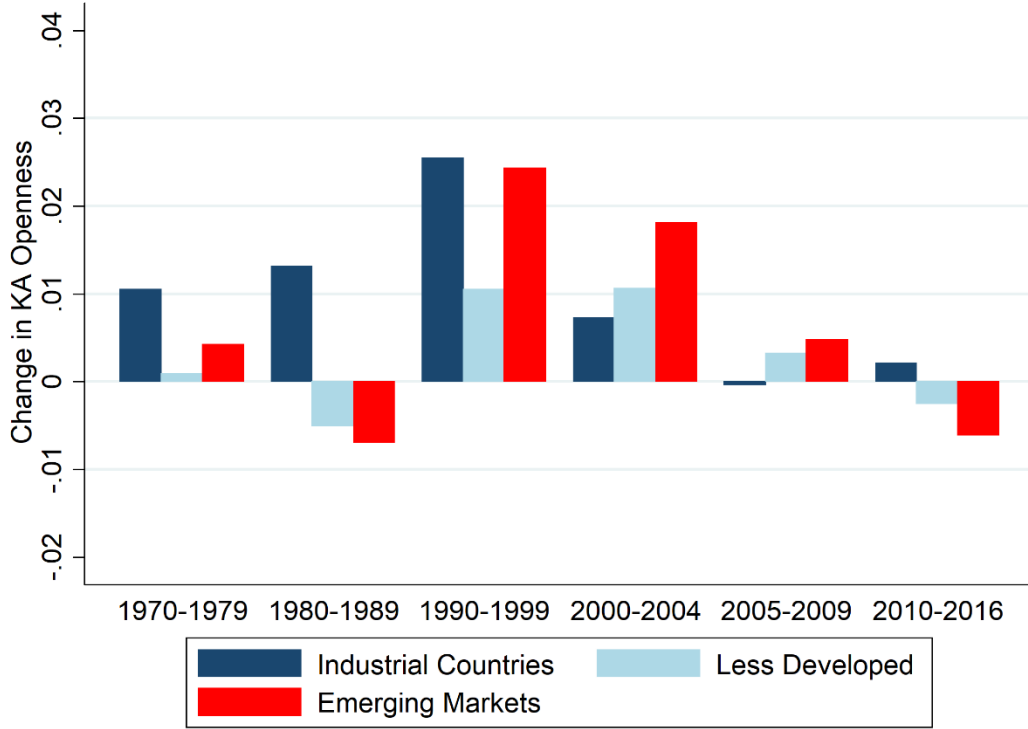
Note: The maximal value of *KAOPEN* is indexed as 1.00 for the sake of easier comparison.

Figure 3: Comparison of *KAOPEN* of Developing Countries across Different Regions



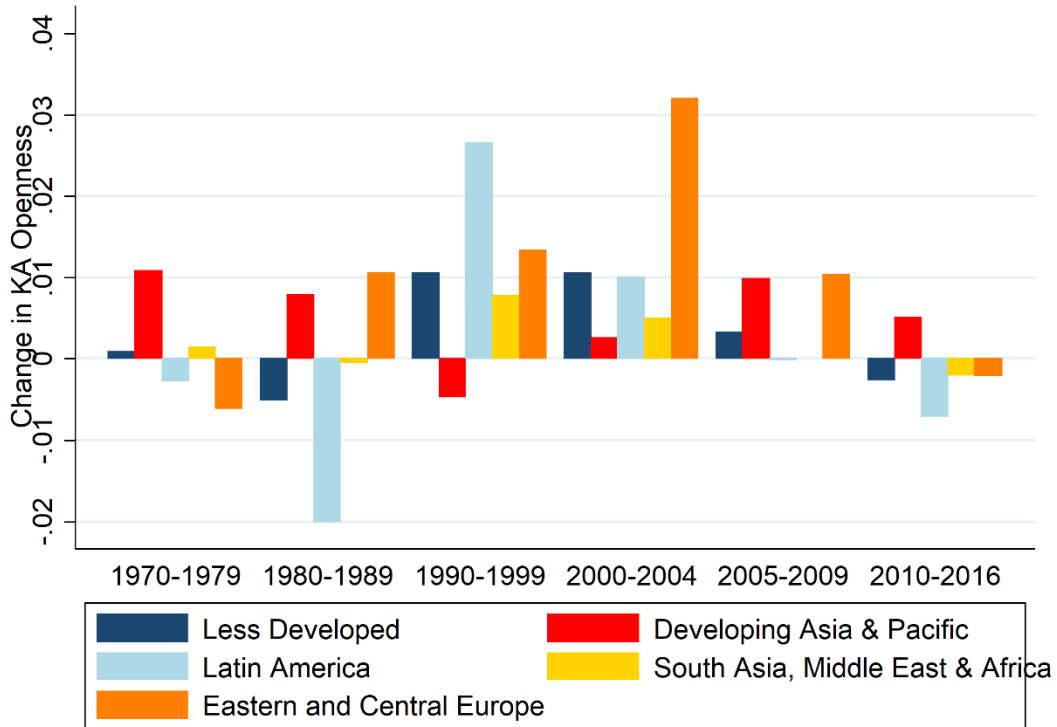
Note: The maximal value of *KAOPEN* is indexed as 1.00.

Figure 4: Change in *KAOPEN* among different income groups



Note: The change in *KAOPEN* is shown as the change in the normalized *KAOPEN* (max=1.00).

Figure 5: Change in *KAOPEN* among geographical groups of developing countries



Note: The change in *KAOPEN* is shown as the change in the normalized *KAOPEN* (max=1.00).