

# Does Corruption Persist In Sub-Saharan Africa?

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**Abstract** Corruption is said to be characterized by persistence. This conclusion is derived from the theoretical literature, although little empirical evidence exists to support it. Using corruption ratings data from the Political Risk Services Group, International Country Risk Guide on 110 countries from 1984 through 2006, I seek to determine whether or not corruption has actually exhibited persistence over this period. The Markov Transition Chain Matrices were used in the empirical analysis. The calculations show that corruption does persist in more than half of the sample. Next I focus on two regions: Sub-Saharan Africa, the Middle East, and North Africa. The analysis shows these regions to be characterized by persistent corruption.

**Keywords** Corruption · Sub-Saharan Africa · Markov transition chain matrices · Economic development

**JEL** O1 · O5 · N47 · C10 · O10 · O50

## Introduction

Corruption has plagued human society throughout history and continues to manifest itself in many nations of the world. Since the 1980s, international agencies, especially the World Bank, have focused on corruption as the single most important aspect

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This paper is based on my Ph.D. Dissertation, October 2008. The results reported here are derived from the full sample of 110 countries.

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for achieving good governance. The implementation of anti-corruption measures, however, turned out to be a slow, if not, an elusive process in many nations where corruption practices have been in evidence for quite sometime.

This paper first looks at evidence of corruption in a sample of 110 countries. Next, I test for persistence of corruption using a sample of 27 Sub-Saharan African countries.

The paper is organized as follows. “[Definitions Concepts and Overview of the Sample](#)” provides the definitions and main concepts relevant to the analysis of corruption. Also in this section, an overview of the countries in the full sample and the African sample is given. “[Modeling Persistence](#)” provides a brief outline of the methodology followed in the data analysis of the corruption ratings scores and reports the findings. Also in this section, I speculate about a possible link between corruption and development. The last section, is the conclusion.

## Definitions, Concepts and Overview of the Sample

### Corruption

The most common definition of corruption is given by Transparency International (1995), “abuse of public office for private gain”. A more complete definition is given by Jain (2001), who defines corruption as:

“... an act in which the power of public office is used for personal gain in a manner that contravenes the rules of the game.”

In this paper, I focus on external corruption because it addresses corruption which arises as one individual or an official of one nation bribes an individual or an official of another nation. Adopting this definition requires that government officials have access to resources, so discretionary power is satisfied, that the institutional frameworks are not efficient, and that officials exhibit rent-seeking behavior.

### Persistence

The literature on corruption often equates the existence of corruption with its persistence. Persistence strictly defined, means ‘continuing to exist’, and when applied to corruption scores, it refers to a country (-ies) maintaining the same corruption score over some period of time. This definition of persistence will be utilized in the empirical analysis.

### The Sample

The analysis begins with an overview of the 110 countries’ corruption scores over the period 1984 through 2006. For ease of analysis, the scores were divided into three categories based on the Political Risk Services (PRS) degree of risk assessment given in Appendix Table 9. These are: most corrupt (scores 0.00 – 3.59), middle corrupt (scores 3.60 – 4.19); and least corrupt (scores 4.20 – 6.00). Table 1 summarizes the results for the entire sample, while Table 2 summarizes the results for the 27 Sub-Saharan nations.

**Table 1** Percentage of countries by “3” corruption categories (Sample  $n=110$ )

Year	No. of Most Corrupt Countries	As a % of Total Sample	No. of Middle Corrupt Countries	As a % of Total Sample	No. of Least Corrupt Countries	As a % of Total Sample
1984	70	64%	17	15%	23	21%
1985	66	60%	20	18%	24	22%
1986	67	61%	20	18%	23	21%
1987	66	60%	19	17%	25	23%
1988	66	60%	20	18%	24	22%
1989	64	58%	21	19%	25	23%
1990	63	57%	20	18%	27	25%
1991	60	55%	21	19%	29	26%
1992	58	53%	22	20%	30	27%
1993	57	52%	24	22%	29	26%
1994	59	54%	24	22%	27	25%
1995	62	56%	22	20%	26	24%
1996	62	56%	24	22%	24	22%
1997	66	60%	24	22%	20	18%
1998	69	63%	23	21%	18	16%
1999	74	67%	20	18%	16	15%
2000	74	67%	21	19%	15	14%
2001	85	77%	10	9%	15	14%
2002	86	78%	11	10%	13	12%
2003	84	76%	12	11%	14	13%
2004	88	80%	8	7%	14	13%
2005	84	76%	10	9%	16	15%
2006	83	75%	13	12%	14	13%

Total sample  $n=110$  countries (refer to Appendix Table 10 for countries therein)

According to Table 1, the percentage of countries belonging to the most corrupt category fell from 64% in 1984 to 52% in 1993. From this, one can deduce that corruption appeared to be falling. However, after 1993, the percentage of nations belonging to this category rose to 75%, a 44% increase over its 1993 value and a 17% increase over its 1984 value. In this same period, the middle and least corrupt categories showed a declining number of countries. The percentage of the middle corrupt countries declined by 20%, while the percentage of the least corrupt nations fell by 38%. From these statistics, one can see why the issue of worsening corruption has become an important development agenda of international agencies. Given the rise in one category of corruption (most) accompanied by the decline in the other two categories of corruption (middle and least), there is evidence of some switching among the countries in the sample. Overall, from Table 1 about 52% of the nations stayed in the most corrupt category, 9% in the middle corrupt category, and 12% in the least corrupt category.

**Table 2** Percentage of countries by “3” corruption categories (Sample  $n=27$ )

Year	No. of Most Corrupt Countries	As a % of Total Sample	No. of Middle Corrupt Countries	As a % of Total Sample2	No. of Least Corrupt Countries	As a % of Total Sample3
1984	19	70%	7	26%	1	4%
1985	19	70%	7	26%	1	4%
1986	19	70%	7	26%	1	4%
1987	19	70%	7	26%	1	4%
1988	19	70%	7	26%	1	4%
1989	17	63%	8	30%	2	7%
1990	17	63%	8	30%	2	7%
1991	18	67%	7	26%	2	7%
1992	19	70%	7	26%	1	4%
1993	19	70%	7	26%	1	4%
1994	20	74%	6	22%	1	4%
1995	19	70%	7	26%	1	4%
1996	23	85%	3	11%	1	4%
1997	23	85%	3	11%	1	4%
1998	24	89%	3	11%	0	0%
1999	24	89%	3	11%	0	0%
2000	25	93%	2	7%	0	0%
2001	25	93%	2	7%	0	0%
2002	27	100%	0	0%	0	0%
2003	26	96%	1	4%	0	0%
2004	26	96%	1	4%	0	0%
2005	26	96%	1	4%	0	0%
2006	25	93%	2	7%	0	0%

Total sample  $n=27$  Sub-Saharan African countries (refer to Appendix Table 10 for countries therein)

According to Table 2, which provides the same information for the African sample of 27 nations, the percentage of countries in Sub-Saharan Africa in the very high risk category of being corrupt ranged from 63 – 100%, while the percentage of countries in the very low risk of being corrupt was less than 7%. The middle corrupt risk category of corruption had between 0 and 30% of the sample. Post 1995, the percentage of countries in the most corrupt category rose sharply, while the percentage of countries in the middle corrupt category fell dramatically. The reverse trend observed here indicates that some countries in middle corruption transited to high corruption for the post 1995 period. Of mention is the lack of Sub-Saharan countries belonging to the least corrupt category. When this pattern is compared to the entire sample of 110 countries, the general rise in the percentage of countries becoming more corrupt in the 20th and 21st centuries is quite pronounced. The priority attached to good governance or low corruption by the World Bank in the 1990s is supported from Tables 1 and 2 as more countries became more corrupt in the post 1990 era.

## Modeling Persistence

Andvig and Moene (1990); Acemoglu (1995); Mauro (1998) and Aidt (2003) advanced the proposition that current corruption is affected by its past values. Corruption as perceived by a particular individual or a country is said to depend critically on how many other individuals in the same organization or country are expected to be corrupt. Mauro (1998) provided the example of two bureaucrats *A* and *B*, who are members of the same public office. Suppose bureaucrat *A* is more corrupt than bureaucrat *B*, with a well-established bribe collection system, and businesses and investors know that the cost of doing business with that office requires the payment of bribes. If the public is made aware of this well-established bribe collection system, it decreases its confidence in the government and could lead to its replacement in the next election. Hence, the shortened horizon of the current government encourages bureaucrat *B* to also become corrupt and accept bribes. Therefore, where the rewards to rent-seeking are higher, more individuals will also seek rents and accept bribes. This makes corruption self-reinforcing and its history becomes a critical determinant of future corruption (Aidt 2003).

To empirically test this definition of corruption, I use the Markov Transition Chain Matrices.<sup>1</sup> The Markov chain matrices are used to examine the long-run tendencies of corruption scores in the Sub-Saharan African sample to determine if corruption persisted from 1984 through 2006. Each country is allocated a corruption score in discrete values that range from 1 (most corrupt) to 7 (least corrupt). In order to explore the long run tendencies of these scores, the transition chain matrices were computed by partitioning the sample into seven states, representative of the corruption scores. Low-numbered states correspond to high corruption and high-numbered states correspond to low corruption. These matrices can then describe a  $7 \times 7$  Markov transition chain process where each entry in the cells represents the probability,  $p_{ij}$ , that a country in state *i* in 1984, transits to some state *j* in 2006, the last period.

Annual corruption indices were obtained from Political Risk Services (PRS), International Country Risk Guide. A full description is given in Appendix Table 8. Descriptive statistics for corruption scores for the full sample are reported in Table 3.

## Corruption Scores

Table 3 provides a summary of the descriptive statistics for corruption scores. The average corruption score over the period fell from a middle-range corrupt value of 3.3 in 1984 to a most-range corrupt value of 2.6 in 2006. The smaller standard deviations shown in column 2 of the table, shows less dispersion of scores around the average, indicating an overall trend of worsening corruption. Panel (a) of Table 3 summarizes the frequency of scores for the 110 countries, while panel (b) shows the percentiles because the PRS altered its allocation of corruption scores from 0, 1, 2, 3, 4, 5, 6 to  $\pm 0.5$  increments in 2001. From panel (b), 90% of the observations may be found below a score of 4.5 in 2006 from 2001, providing evidence in support of the findings shown in Table 1.

<sup>1</sup> This discussion on the Markov Transition Chain Matrices borrows heavily (often verbatim) from Quah (1993) and Sinclair (2005a, b).

**Table 3** Descriptive statistics of corruption scores

Year	Mean ( $\mu$ )	STD. DEV. ( $\sigma$ )	Panel (a)							
			Frequency, range scores [ 0, 6 ]							
			0	1	2	3	4	5	6	Totals
1984	3.32	1.57	4	8	24	34	17	8	15	110
1985	3.30	1.57	5	6	22	33	20	9	15	110
1986	3.29	1.52	5	4	24	34	20	10	13	110
1987	3.34	1.49	5	3	22	36	19	13	12	110
1988	3.32	1.45	5	3	21	37	20	14	10	110
1989	3.35	1.46	5	2	23	34	21	15	10	110
1990	3.41	1.42	3	3	23	34	20	17	10	110
1991	3.48	1.43	2	5	21	32	21	18	11	110
1992	3.54	1.42	2	6	15	35	22	19	11	110
1993	3.61	1.32	1	3	16	37	24	18	11	110
1994	3.59	1.28	1	3	14	41	24	17	10	110
1995	3.55	1.26	1	2	16	43	22	16	10	110
1996	3.44	1.27	1	4	19	38	24	17	7	110
1997	3.26	1.29	1	5	28	32	24	14	6	110
1998	3.17	1.31	1	7	29	32	23	12	6	110
1999	3.10	1.27	1	6	31	36	20	10	6	110
2000	3.03	1.29	0	10	33	31	21	9	6	110
Year	Mean	STD. DEV.	Panel (b)							
			Percentiles						Totals	
			10%	25%	50%	75%	90%			
2001	2.61	1.24	1	2	2	3	4.5	110		
2002	2.57	1.22	1	2	2	3	4.5	110		
2003	2.63	1.21	1	2	2.5	3	4.5	110		
2004	2.58	1.18	1.5	2	2.25	3	4.5	110		
2005	2.59	1.28	1.25	1.5	2.25	3	5	110		
2006	2.60	1.24	1.25	2	2.5	3	4.5	110		

Source: PRS, ICRG corruption scores from 1984 through 2006

Note: in 2001 the PRS allocated scores in discrete values of 0.5 increments

Preliminary examination of corruption scores show that corruption has persisted over the period in some countries, while worsening or improving in others. To quantify the persistence of corruption observed from the time plots, the Markov transition chain matrices were used. The results are discussed in the next section.

**Results: Markov Transition 7×7 Chain Matrix**

Table 4 presents the 7×7 Markov transition chain process. Each cell entry represents the probability,  $p_{ij}$ , that a country in state  $i$  in 1984 transits to some state  $j$  in 2006. The rows of the matrix represent the corruption state (or its score) in 1984 and the

**Table 4** Chain matrices for 7 states

Corruption States (Corruption scores 1 through 7)							
(a) Corruption scores averaged from 1984 to 2006							
Number	1	2	3	4	5	6	7
48	0.80	0.09	0.09	0.02	0.00	0.00	0.00
134	0.03	0.85	0.10	0.02	0.01	0.00	0.00
598	0.00	0.03	0.87	0.08	0.01	0.00	0.00
750	0.00	0.00	0.09	0.86	0.05	0.00	0.00
413	0.00	0.00	0.04	0.09	0.83	0.04	0.00
289	0.00	0.00	0.00	0.03	0.07	0.89	0.01
188	0.00	0.00	0.00	0.00	0.01	0.07	0.92
Ergodic	0.01	0.07	0.33	0.32	0.15	0.08	0.04
(b) Corruption scores one 22-year transition (1984–2006)							
n	1	2	3	4	5	6	7
4	0.00	0.50	0.50	0.00	0.00	0.00	0.00
8	0.00	0.12	0.50	0.25	0.12	0.00	0.00
24	0.04	0.17	0.46	0.29	0.04	0.00	0.00
34	0.00	0.00	0.47	0.44	0.06	0.03	0.00
17	0.00	0.18	0.41	0.23	0.18	0.00	0.00
8	0.00	0.00	0.12	0.25	0.38	0.25	0.00
15	0.00	0.00	0.00	0.07	0.20	0.47	0.26
Ergodic	0.02	0.11	0.46	0.32	0.07	0.01	0.01

Source: PRS, International Country Risk Guide, Corruption Scores

‘n’ refers to the respective sample size, since countries scores in 1984 were compared to its 2006 value

columns for that in 2006. Panel (a) of Table 4 contains a one-step annual transition by averaging the observed one-year transitions over every year from 1984–1985, ..., 2005–2006; while panel (b) shows the overall 22-year transitions from 1984 through 2006.

The diagonal entries of the matrices, characterize the probability that a country stayed in the same state over the entire time period. I assume that probabilities exceeding 0.75 would reflect persistent corruption or low mobility among countries, while probabilities, which are lower than 0.50 would represent less pronounced persistence or high mobility. Additionally, to determine the transitions of countries to higher or lower states, the off-diagonal entries were examined. In general, high left off-diagonal entries indicate transitions to lower states or worsening corruption; and high right off-diagonal entries indicate transitions to higher states or lower corruption.

From the one-step annual transition matrix in Table 4(a), the main diagonal probabilities were all above 0.75, indicating high persistence in corruption scores or low mobility among countries. The first column gives the total number of transitions with starting points in that corruption state. For example, the third row entry of 598 shows that over the entire sample — across 110 countries and across 22 years — 598 observations fell in state 3. Thus, these observations had corruption scores between 1

and 2 (*i.e.* between states 2 and 3), the highly corrupt states. Of these, 87% remained in that same state in the following year. Similarly, the entry in the last row of 188 indicates that 188 observations fell in state 7, *i.e.*, had corruption scores between 5 and 6, the least corrupt states; whereas 92% of them stayed in the same state.

Despite the observed persistence of corruption with diagonals above 0.80 in the one-step annual transition matrix, from states 4 through 7, a representative economy is marginally more likely to have worsened in terms of its corruption rankings. This is seen by higher off-diagonal entries to the left, while countries in states 1 through 3, the high corrupt states, are marginally more likely to have improved their corruption rankings.

In the 22-year transition from 1984–2006, shown in Table 4(b), the diagonal entries were much lower. This could have been due to either the PRS group changing its 0, 1, 2, 3, 4, 5, 6 ranking of corruption to also include scores with differences of  $\pm 0.5$ , or the long lag between the respective years. As shown in the table, the diagonal entries were all less than 0.50, indicating high mobility among countries.

The fourth row entry of 0.44 indicates that of the 34 countries in state 4, only 15 (*i.e.* 0.44 of 34) of them maintained the same corruption score in 1984 and 2006. Of the remaining countries, 16 transited one state down, 2 transited one state up, and 1 transited two states up. In general, for states 4 through 7, transitions to lower states were significantly higher than transitions to higher states. This suggests that relatively clean or less-corrupt nations in 1984 were perceived as becoming more corrupt in 2006, while the reverse pattern exists for the 36 countries in states 1 through 3. These nations had more transitions to higher states or less corruption. This general finding resembles the results of the one-step averaged transition matrix in Table 4(a), however with more pronounced mobility.

### The Full Sample: Comparing 1984 and 2006 Corruption Scores

Next, I partition the countries into three categories of corruption, in accordance with the PRS risk assessment guide. The results are summarized in Table 5. After apportioning the scores into high, middle, and low corruption, I found that 81 of the 110 countries or 73% of the sample maintained the same corruption score in 1984 and 2006, thus depicting persistent (high) corruption. Of this total, 68 countries were low or middle income countries, and 13 were high income countries. The apportionment also reveals that only 4% of the sample showed improvements in their corruption scores, while 22% experienced the opposite or worsening scores.

As shown in Table 5, Chile was the best performer as it moved from high to low corruption. It was ranked by Transparency International (TI) in 2005 at 7.3 on a 10-point scale, the same rank as Japan. Among the worse performers were Costa Rica<sup>2</sup>, Israel, Malaysia and South Africa. These nations transitioned from low corruption in 1984 to high corruption in 2006. High income countries that experienced worsening

<sup>2</sup> Costa Rica, a nation which had enjoyed 59 years of uninterrupted democracy and which was considered to be one of the most stable Latin American countries is quoted as being the 'second most pessimistic' country according to TI when it comes to corruption.



**Table 5** Countries by category of corruption**Persistent corruption scores (73%)***High: (n= 65)*

Algeria, Angola, Bahrain, Bangladesh, Bolivia, Colombia, Congo, Dem. Rep., Congo, Rep., Côte d'Ivoire, Cuba, Dominican Republic, Ecuador, Egypt, El Salvador, Gabon, Gambia, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Kuwait, Libya, Mali, Mexico, Morocco, Myanmar, Nicaragua, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Saudi Arabia, Senegal, South Korea, Sri Lanka, Sudan, Suriname, Syria, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Arab Emirates, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

*Middle: (n= 3)*

Madagascar, Portugal, Spain.

*Low: (n= 13)*

Australia, Austria, Canada, Denmark, Finland, Iceland, Luxembourg, Netherlands, New Zealand, Norway, Singapore, Sweden, Switzerland.

**Improved corruption scores (5%)***High to Middle: (n= 4)*

Bahamas, Botswana, Cyprus, Malta

*High to Low: (n= 1)*

Chile

**Worsened corruption scores (22%)***Middle to High: (n= 14)*

Albania, Argentina, Brazil, Burkina Faso, China, Ethiopia, Hungary, Italy, Malawi, Mongolia, Mozambique, Niger, Somalia, Taiwan

*Low to Middle: (n= 6)*

Belgium, France, Ireland, Japan, United Kingdom, United States

*Low to High: (n= 4)*

Costa Rica, Israel, Malaysia, South Africa

*Source:* PRS, International Country Risk Guide, Corruption Scores in 1984 and 2006.

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The number of countries belonging to each group is given in parenthesis

Table only compares corruption scores in 1984 to those in 2006

Corruption levels were divided by scores as follows: high=corruption scores 0.00 – 3.59, middle=corruption scores 3.60 – 4.19, and low=corruption scores 4.20 – 6.00

corruption includes: Ireland, Japan, the United Kingdom and the United States, where the data show them to transition from low to middle corruption states.<sup>3</sup>

**Corruption: The Sub Samples**

In this section, I repeat the one step transition matrices for two regions: Middle East and North Africa and Sub-Saharan Africa. Including the Middle East, countries in North Africa, Algeria, Egypt, Libya, Morocco, and Tunisia are usually considered

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<sup>3</sup> Interpretation of the results reported here should be cautioned since they were computed based on the comparison of corruption scores in the years 1984 and 2006 only.

**Table 6** Chain matrices for Middle East and North Africa

Number	1	2	3	4	5	6	7
<i>(a)</i> Region 1: Middle East and North Africa							
Corruption scores ( $n=15$ )							
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	0.00	0.00	0.94	0.05	0.01	0.00	0.00
143	0.00	0.00	0.07	0.87	0.07	0.00	0.00
59	0.00	0.00	0.05	0.11	0.78	0.05	0.00
12	0.00	0.00	0.00	0.08	0.00	0.92	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>(b)</i> Region 2: Sub-Saharan Africa							
Corruption scores ( $n=27$ )							
23	0.88	0.05	0.07	0.00	0.00	0.00	0.00
81	0.01	0.92	0.06	0.02	0.00	0.00	0.00
169	0.01	0.04	0.90	0.04	0.02	0.00	0.00
199	0.00	0.00	0.10	0.85	0.05	0.00	0.00
105	0.00	0.01	0.06	0.10	0.82	0.01	0.00
15	0.00	0.00	0.00	0.13	0.00	0.79	0.08
2	0.00	0.00	0.00	0.00	0.00	0.50	0.50

Source: PRS, International Country Risk Guide, Corruption Scores 1984 through 2006

$n$  refers to sample size

as Middle Eastern countries and not North African. The findings are given in Table 6(a, b).

From Table 6(a), the Middle Eastern and North African countries show persistent corruption since their diagonal entries were greater than 0.78. It should be noted, however, that the most corrupt states (1 and 2) and the least corrupt state (7) contained no observations for this group. In the middle corruption states 3 through 5; 94% of the observations stayed in state 3, 87% in state 4 and 78% in state 5. Note that the small number of observations (only 12) in state 6 indicates that most countries in this region maintained persistently middle-level corruption over the period.

From Table 6(b), the Sub-Saharan nations also depicted persistent corruption in the low and middle corruption states as their diagonal entries exceeded 0.79, once state 7 was excluded. State 7 contained only 2 observations hence no further analysis was carved out. The same applies to state 6 with 15 observations. This leaves the high-middle corruption states with sufficient data for investigation. The high corrupt states 1 and 2 depicted persistence of 88% and 92% respectively; while the middle corrupt states (3 through 5) show persistence of 90%, 85% and 82%.

When the two regions were compared a clear pattern emerges: The Middle East and North Africa is characterized by persistent corruption in the middle corrupt states, while Sub-Saharan Africa is characterized by persistent corruption in both the high and middle corrupt states.

## Corruption and Development

Given the above evidence on corruption obtained with the full sample of 110 countries, a question that needs to be addressed is whether the level of development has a bearing on corruption. Using the World Bank's 2006 income classification of economies by their gross national income (GNI) per capita, one-step transition matrices were computed on the full sample. The calculations are given in Table 7 for low, middle and high-income nations.

From Table 7, both high- and low-income nations show persistent corruption over the 22-year period, since their diagonal entries were all greater than 0.75. The

**Table 7** Level of development chain matrices for 7-States

Number	1	2	3	4	5	6	7
(a) Low income (GNI per capita less than or equal to \$905)							
Corruption scores ( $n=29$ )							
30	0.89	0.04	0.07	0.00	0.00	0.00	0.00
84	0.05	0.82	0.11	0.02	0.00	0.00	0.00
220	0.01	0.08	0.84	0.07	0.01	0.00	0.00
193	0.00	0.01	0.15	0.81	0.03	0.00	0.00
104	0.00	0.03	0.02	0.20	0.71	0.04	0.00
7	0.00	0.00	0.00	0.00	1.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(b) Middle income (GNI per capita \$906–\$11,115)							
Corruption scores ( $n=46$ )							
11	0.64	0.00	0.21	0.14	0.00	0.00	0.00
48	0.02	0.86	0.10	0.01	0.00	0.00	0.00
292	0.00	0.02	0.85	0.10	0.02	0.00	0.00
432	0.00	0.00	0.08	0.88	0.04	0.00	0.00
161	0.00	0.00	0.12	0.09	0.76	0.03	0.00
65	0.00	0.00	0.00	0.10	0.07	0.84	0.00
3	0.00	0.00	0.00	0.00	0.00	0.33	0.67
(c) High income (GNI per capita greater than or equal to \$11,116)							
Corruption scores ( $n=35$ )							
6	1.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.67	0.00	0.00	0.00	0.33	0.00	0.00
86	0.00	0.03	0.87	0.07	0.01	0.01	0.00
125	0.00	0.00	0.12	0.80	0.07	0.01	0.00
141	0.00	0.00	0.01	0.11	0.80	0.08	0.00
224	0.00	0.00	0.00	0.01	0.11	0.86	0.11
185	0.00	0.00	0.00	0.00	0.01	0.11	0.88

Source: PRS, International Country Risk Guide, Corruption Scores 1984 through 2006

$n$  refers to sample size

Middle income economies in this essay combine the World Bank's lower middle and upper middle income economies.

general pattern observed is persistent higher-corruption for low income nations in states 1 through 4; while for high income countries persistent corruption is found in states 3 to 6. Note also that in the high income nations, the lower states had fewer transitions when compared to the higher states, as depicted by the smaller values in the number column in these states in Table 7 panel (c). For example, the sixth row entry indicates that for the low-income sample — across 35 countries and across 110 years — 224 observations fell in state 6, i.e. had corruption scores between 4 and 5, or very low corruption; while, 86% remained in the same corruption state. Overall, it found that high-income nations had more transitions in the higher states since they started out with better corruption scores compared to the low-income nations, which had more transitions in the lower states even though they started out with low corruption scores. This is shown by the lower number of observations in the higher (lower) states for low (high) income sample.

The main diagonal for the middle-income sample suggests that countries, which were in the high corrupt states, i.e. 1 through 3, experienced more upward transitions as seen from panel (b) of Table 7. Additionally, countries that were initially in middle or least corruption states experienced more downward transitions to lower states, or became more corrupt. Those countries with corruption scores between 2 and 3 lay at the margin of high and middle corruption; they had the tendency to transit to a higher corruption state.

According to the findings reported in Table 7, low and high-income nations had a greater tendency to maintain their initial corruption scores over time or exhibit persistence. Middle income nations that were initially considered as being highly corrupt, had more (marginally) transitions to less corrupt states or a reverse pattern if they were initially less corrupt. This finding is crucial since 22 of the Sub-Saharan sample ( $n=27$ ) are classified as low-income countries using the World Bank's income benchmark. Since the results reported here support persistent corruption exceeding 0.71 in corruption states 1 through 4 for the low-income sample, one may conclude that in the absence of significant development Sub-Saharan African countries are more likely to exhibit high levels of corruption.

## Conclusion

This paper examined this issue of persistence in corruption using a sample of 110 countries over the period 1984–2006. It also investigates the link between a country's level of development and corruption. The paper's findings provide evidence that corruption did persist in some countries. This result is derived from data on annual corruption ratings compiled by Political Risk Services. The method of analysis is the Markov Transition Chain Matrices, which traces the transitions of countries into different corruption states. The averaged one-step annual chain matrix found that the main diagonal entries exceeded 0.8, indicating that almost half of the countries in the sample stayed in the same corruption state over the period. Additionally, from states 4 through 7, a representative economy was marginally more likely to have worsened in terms of its corruption rankings, while countries in states 1 through 3, are marginally more likely to have improved their corruption rankings.

When the Middle Eastern and North African, and Sub-Saharan African regions were compared with one another, it turns out that the Middle Eastern and North African countries are characterized by persistent corruption in the middle corrupt states, while Sub-Saharan Africa is characterized by persistent corruption in both the high and middle corrupt states.

To test if the level of development was a likely contributor to persistent corruption, the sample was apportioned into low, middle and high-income subsamples and income transitional matrices were computed. Based on these matrices, low and high-income nations turned out to have a greater tendency to maintain their corruption scores overtime, or exhibit steady-corruption states. Middle income nations that were initially considered as being highly corrupt had more (marginally) transitions to less corrupt states or a reverse pattern if they were initially less corrupt. This evidence supports a stable low equilibrium with high corruption for low-income nations, and a stable high equilibrium with low corruption for high-income countries.

Corruption scores, although being a subjective measure of external or macro-level corruption, are useful indicators in the analysis of the persistence of corruption.

## Appendix

**Table 8** Variable definitions and sources

Variable	Definition	Source
Corruption	<p>Range 0 through 6 (rescaled 1 – 7)</p> <p>0=high corruption</p> <p>6=little corruption</p> <p>The corruption indices are one assessment of political risks by PRS. It captures political risks to institutional investors, banks, multinational corporations, importers, exporters, foreign exchange traders, and shippers. It is concerned with actual or potential corruption in the forms of special payments and bribes connected to providing public goods. These goods include: import and export licenses, exchange controls, tax assessments, police protection, and loans.</p>	<p>Political risk services, International country risk guide</p>
Income classification	<p>The World Bank divides economies according to their 2006 GNI per capita, using Bank's Atlas method. Using the classification of economies by the World Bank, the countries in the sample were apportioned into four groups: low income, \$905 or less; lower middle income, \$906 – \$3,595; upper middle income, \$3,596 – \$11,115; and high income, \$11,116 or more.</p>	<p>World Bank classification of economies by income</p>

**Table 9** PRS, Degree of risk assessment

Risk Category	Percentage Range	Corruption Scores Range
Very high risk	00.0 to 49.9 percent	00.0 to 2.994
High risk	50.0 to 59.9 percent	3.00 to 3.594
Moderate risk	60.0 to 69.9 percent	3.6 to 4.194
Low risk	70.0 to 79.9 percent	4.2 to 4.794
Very low risk	80.0 to 100 percent	4.8 to 6.000

Source: International Country Risk Guide (ICRG), The PRS Group Inc., chapter 2, *The ICRG Rating Scheme*

**Table 10** Regional distribution of countries in sample ( $n=110$ )

East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa
Australia	Albania	Argentina	Algeria	Canada	Bangladesh	Angola
China	Austria	Bahamas	Bahrain	United States	India	Botswana
Indonesia	Belgium	Bolivia	Egypt		Pakistan	Burkina Faso
Japan	Cyprus	Brazil	Iran		Sri Lanka	Congo, DR
Malaysia	Denmark	Chile	Israel			Congo, Rep.
Mongolia	Finland	Colombia	Jordan			Côte d'Ivoire
Myanmar (Burma)	France	Costa Rica	Kuwait			Ethiopia
New Zealand	Greece	Cuba	Libya			Gabon
Philippines	Hungary	Dominican Republic	Malta			Gambia
Singapore	Iceland	Ecuador	Morocco			Ghana
South Korea	Ireland	El Salvador	Qatar			Guinea
Taiwan	Italy	Guatemala	Saudi Arabia			Guinea-Bissau
Thailand	Luxembourg	Guyana	Syrian, Arab Republic			Kenya
Vietnam	Netherlands	Haiti	Tunisia			Madagascar
	Norway	Honduras	United Arab Emirates			Malawi
	Poland	Jamaica				Mali
	Portugal	Mexico				Mozambique
	Romania	Nicaragua				Niger

**Table 10** (continued)

	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa
		Spain	Panama				Nigeria
		Sweden	Paraguay				Senegal
		Switzerland	Peru				Somalia
		Turkey	Suriname				South Africa
		United Kingdom	Trinidad & Tobago				Sudan
			Uruguay				Tanzania
			Venezuela				Uganda
							Zambia
							Zimbabwe
No. of countries	<b>14</b>	<b>23</b>	<b>25</b>	<b>15</b>	<b>2</b>	<b>4</b>	<b>27</b>
% of Sample ( <i>n</i> =110)	<b>13%</b>	<b>21%</b>	<b>23%</b>	<b>14%</b>	<b>1%</b>	<b>3%</b>	<b>25%</b>

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