An Empirical Analysis of Selected Factors Affecting Corruption in the Asia-Pacific Region*

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Abstract

Despite endorsing an anti-corruption plan for the Asia-Pacific, the governments of the region are burdened by endemic corruption that hampers governance in the region. Corruption remains a highly emotive issue, subject to normative judgments that cannot serve as a foundation for the planning or materializing of rational plans that might lead to its curtailment.

This article looks at the effect of selected factors empirically on the degree of corruption across several countries of the Asia Pacific region. The primary objective is to verify the prior academic work that links openness, as defined by the ratio of volume of international trade, to a country's Gross Domestic Product (GDP), with a reduction in corruption for the Asia Pacific region exclusively.

The article also examines the popular perception that associates a rise in per capita GDP with reduced corruption for the Asia-Pacific region. The affect of other factors such as the population density of a country, its military expenditure and amount of arable land, are also examined. The results are tested to see if they are robust enough to be used across different datasets that can account for the degree of corruption in a country. The relationship between the prescribed variables varies slightly with the corruption dataset used.

Keywords: Asia-Pacific region, corruption, GDP per capita, openness, Ordinary Least Squares (OLS) Regression, Ordered Probit Models.

Introduction

This article seeks to determine the factors that affect the degree of corruption in various countries of the Asia-Pacific region. It will incorporate the use of an Ordered Probit model, which will identify the factors seen as commonly influencing corruption in the region. These are then used to evaluate the effect they have on the degree of corruption, as measured by the International Country Risk Guide (ICRG) Index, constructed by Political Risk Services (PRS), and the Corruption Perceptions Index (CPI) from Transparency International (TI).

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In this regard, one of the objectives of this article is to verify prior academic studies that link openness, as defined by the ratio of volume of international trade to a country's GDP, with a reduction in corruption. The other objective is to analyze the second most popular perception that associates a rise in per capita GDP with a reduction in corruption. The possible relation between corruption and other factors, such as the population density of a country, its military expenditure and amount of arable land, are also examined. The overall aim of this article is to examine the individual significance of chosen independent variables on the corruption index, i.e. the degree of corruption.

Corruption has been identified as a significant hindrance to the developmental efforts of Least Developed Countries (LDCs). The International Monetary Fund (IMF) has projected that corruption can reduce a country's GDP by more than 0.5 percent. The World Bank (World Bank 2000) has estimated that that the cost of corruption worldwide amounts to $USD80 billion a year. A significant amount of that cost is borne by the Asia-Pacific region. Despite endorsing an anti-corruption plan for the Asia Pacific, the governments of the region are burdened by endemic corruption that hampers governance in the region.

Corruption's impact on different areas of an economy, or on different macro variables, is a fairly new research area in economics which in recent times has been attracting further attention.[*]

The organization of this article is as follows: the second section contains a discussion of related literature; the third section lays down the methodology, model specification and discusses the data sources; the fourth section presents the empirical results derived from this article; and the final section concludes the article.

Review of Literature

Empirical literature differs on whether or not the effect of corruption is harmful to an economy or not. Some studies have advocated that corruption "greases the wheels" of business and commerce, thus facilitating growth and investment (Leff 1964; Lui 1985). Others have claimed that it does the reverse, viewing corruption as a primary impediment to growth and having dramatic consequences in the developing world (Mauro 1995; Kaufmann and Kraay 2002).

Corruption and GDP per capita

The following section analyzes the literature that makes an association between corruption and the explanatory variables chosen in this article.

In the first instance, we look at the association between per capita income and corruption. Mauro (1995) found a strong relationship between per capita income and an average of indices of red tape, inefficient judiciary, and corruption.

Easterly (1999) used several indicators, including the degree of corruption, to show how the quality of life across nations is positively associated with per capita income.

Clague, Keefer, Knack, and Olson (1996) also made a connection between high

[*] For a review article on meaning and policy implications of corruption, see Bardhan (1997).

per capita income and high-quality institutions: freedom from expropriation, contract repudiation, corruption, and rule of law.

Husted (1999) and Olson, Sarna, Naveen and Swamy (1999) looked at the positive relationship between poverty and corruption: how the former reduces necessary resources to fight the latter. They maintain that transparency increases with income (i.e. per capita income).

Kaufmann, Kraay and Zoido-Lobaton (1999) examined the relationship between corruption and GDP per capita, taking into account simultaneity problems through the use of instrumental variables. They found that an increasing GDP per capita was a precursor to lower measures of corruption.

Corruption and openness

It was Krueger (1974) who pioneered the study of openness and corruption. She found that trade restrictions shift resources from productive activities to rent-seeking activities.

Torrez (1995: 387-403) estimated the same relationship using four other control variables. He found that the negative relationship established by Kruger does not hold for the International Country Risk Guide (ICRG) dataset, which also happens to be the biggest dataset.

Kaufmann (1996) and Kaufmann and Kaliberda (1996) examined the growth of the unofficial economies, or black market economies, of Former Soviet Union (FSU) countries, which grew from 12 percent to 33 percent of the GDP (an average figure for all countries) during the 1989–1994 period, when these transition economies began to open up. The growth in the black market signals a concurrent growth in corruption to allow such growth. Hence they see openness as increasing corruption.

Corruption and military expenditure

Gray and Kaufmann (1998) examined how corruption in public spending increases inequality between rural and urban groups. Resources to rural public projects that are not easily manipulated are withheld, despite their higher social value. Instead, politicians and bureaucrats favor large-scale defense projects, as their value and secretive nature allow more opportunities for rent seeking behavior.

Tanzi and Davoodi (1997) support these findings with their study that revealed the "presence of corruption tends to increase the public investment while lowering its productivity." They used measures of corruption, government revenue and quality of public investment in cross-country regressions (Tanzi and Davoodi 1997).

Methodology and Model Specification

Methodology

In order to construct an empirically valid model to measure the impact of selected factors on the degree of corruption across countries, an ordered probit model is used. Such models are suited to the use of dependent variables that are discrete and inherently ordered into categories. They bear the closest resemblance to conventional linear models when analyzing ordered categorical data, and are also known as proportional odds models (Snapinn and Small, 1986).

Multinomial probit models would fail to account for the ordinal nature of the dependent variable, whereas linear regression would treat the rankings for their absolute values. Since both our dependent variables, the ICRG Index and the CPI, are ordinal rankings, the Ordered Probit model is preferred.

McKelvey and Zaviona and (1975) used such a model to analyze congressional voting in the United States on the Medicare bill in 1965**.** A similar model is used in this study, as shown in the formula below, where we use the ICRG index as the dependent variable.

$$Z^* = \alpha + \beta' X$$

$$Y_i = \begin{cases} 0 & \text{if } Z^* \leq \tau_1; \\ 1 & \text{if } \tau_1 \leq Z^* < \tau_2; \\ 2 & \text{if } \tau_2 \leq Z^* < \tau_3; \\ . & \\ . & \\ n & \text{if } \tau_n \leq Z^*. \end{cases}$$

where,

$Y_i = 0$ if degree of corruption is lowest

Y_i = 1 if degree of corruption is slightly higher than previous category (zero)

Y_i = 2 if degree of corruption is slightly higher than previous category (one)

Y_i = 3 if degree of corruption is slightly higher than previous category (two)

Y_i = 4 if degree of corruption is slightly higher than previous category (three)

Y_i = 5 if degree of corruption is slightly higher than previous category (four)

Y_i = 6 if degree of corruption is highest

and Z^* is the cutoff point.

In this case, *Z* is our unobserved latent variable, which is the underlying scale of the dependent variable. However, we observe the categories of *Z* that each country falls into. The error term is normalized with a mean and variance of zero and one respectively. There is no separate constant term with *Z* itself functioning as the constant term. The estimation technique used to solve the model is the Maximum-likelihood approach. The use of the CPI index as the dependent variable necessitates the adoption of a similar model. The latent variable *Z* here is divided into ten separate categories. Grouping in the lowest category (zero) signifies a country that has the highest perception of corruption, with progressive increases indicating lower corruption, culminating in the CPI score of ten (i.e. lowest corruption perception).

This article uses linear regression to serve as a base for comparisons between Ordinary Least Squares regression (OLS) and Ordered Probit results. The possible endogenity problems were accounted for by the use of lag variables among the independent variables. The results are tested for validity and goodness of fit using the standard tests for such models (i.e. the significance of individual co-efficients and McFadden R^2).

Model specification
The methodology and the theoretical foundations of the ordered probit model described above serve as the basis for the econometric models used in this article. The definitions of each variable used are described below in Table I.

The model used with the ICRG index (ICRG) as the dependent variable follows:

$$Z_{ICRG} = \alpha + \beta PCI + \chi OPEN + \delta ME + \phi AL + \gamma PD + \varepsilon \quad (1)$$

The model used with the CPI index (TI) as the dependent variable is similar, with only the dependent variable changed to reflect the use of a different index as follows:

$$Z_{CPI} = \alpha + \beta PCI + \chi OPEN + \delta ME + \phi AL + \gamma PD + \varepsilon \quad (2)$$

The coefficient for per capita GDP (PCI) is expected to be $\beta<0$ for the ICRG index (equation 1) (i.e. a higher per capita income in a country will have a negative effect on corruption in that country). The coefficient χ, associated with the openness (OPEN) of an economy, is anticipated to be negative with the use of the ICRG index, as an increased openness in a domestic economy simultaneously brings transparency and efficiency to its operations. It is expected that $\delta>0$, with the usage of ICRG index as the dependent variable, as a country with a higher component of its GDP used for military expenditure (ME) will be more susceptible to higher levels of misappropriation and as such, expenditure is seldom transparent.

Country variations are captured in the variables of arable land (AL) and population density (PD). It is anticipated that if countries have a higher percentage of arable land, this will result in a negative effect on the level of corruption (i.e. we expect $\phi<0$). The relative abundance of land (a source of income), if fairly distributed, would satisfy the economic needs of individuals and hinder rent-seeking behavior. However, there may be an opposite effect if there is a concentration of such land in a few elite hands. This mismatch leads to a duality in the application of the law that augurs badly for transparency and accountability (Alesina and Angeletos 2005).

The reverse logic applies to population density (PD), where the expectation is that $\gamma>0$. Countries with a higher density population are more likely to be categorized under the higher brackets of the corruption indices. This follows as the pressures of population place an increasing strain on governance, thus increasing corruption. The expected signs of the coefficients are reversed with the usage of the CPI Index (TI) as the dependent variable (equation 2), as higher values of the CPI Index indicate lower corruption perception or corruption, as opposed to the ICRG Index. The selected variables reflect an effort to use data that has the least problems in terms of reverse causality. Both equation (1) and (2) are also used to conduct regression.

Data sources
This article's empirical analysis was conducted using different datasets for the dependent variables (i.e. the PRS and TI datasets). In the case of equation (1), six annually calculated

data series over twenty-two years (1984-2005) were used for fourteen countries from the Asia-Pacific region. The equation using the TI dataset also used six, annually calculated data series from 1995-2004 (ten years) for twelve countries from the Asia-Pacific region. The lower number of countries in this model is due to the lack of data availability for Brunei, Papua New Guinea and Mongolia in the TI dataset. However, the availability of data for Hong Kong in this same dataset led to its inclusion in equation (2). Except for these minor differences, both datasets use the same countries, providing a realistic base for comparison of the results.

The ICRG Index, compiled by the Political Risk Services Group (PRS), a private firm, is the largest and most reliable dataset available on corruption. The ICRG utilizes a three-dimensional evaluation system that weighs the composite risk, while identifying desegregated political, financial and economic risks by using a predetermined number of risk sub-indicators (Rahman et al. 2000). These are classified into three central categories: political, financial and economic (Rahman et al. 2000). The ICRG index is scaled for the purpose of this article into six categories, with zero representing the lowest degree of corruption and six representing the highest degree of corruption.

Table 1: Variables used in the model

Variables	Definition
ICRG	An index of corruption for countries with a maximum of 6 (highest risk) and a minimum of 0 (lowest risk).
CPI	An index of corruption with a maximum of 10 (highest corruption) and a minimum of 0 (lowest corruption).
PCI	GDP per capita is gross domestic product divided by mid-year population. Data is in constant U.S. dollars.
OPEN	The sum of exports and imports divided by GDP (openness of an economy).
ME	Military expenditure data as a percent of GDP.
AL	Arable land as a percent of total land area.
PD	Population density is midyear population divided by land area in km^2.

Transparency International (TI) publishes yearly rankings of countries on the overall extent of corruption (frequency and/or amount of corruption) in the public and political sectors in its Corruption Perceptions Index (CPI). The CPI is calculated using data from 14 sources originating from 12 independent institutions. A country's mean value is set by undertaking a matching percentiles technique, which utilizes the ranks of countries reported by each individual source (Transparency International 2008). This is a useful method for combining sources that have different distributions, as it allows all reported scores to remain within the bounds of the CPI, that is, between zero and ten (Transparency International 2008). The accuracy of the confidence interval estimates increases with a growing number of sources.

Table 2: Asia-Pacific countries used in the study

CPI (TI) data	*ICRG (PRS) data*
Australia	Australia
China	Brunei
Hong Kong	China
Indonesia	Indonesia
Japan	Japan
Republic of Korea	Republic of Korea
Malaysia	Malaysia
New Zealand	Mongolia
Philippines	New Zealand
Singapore	Papua New Guinea
Thailand	Philippines
Vietnam	Singapore
	Thailand
	Vietnam

The World Development Indicators (WDI) database, maintained by the World Bank, was the source of data for real per capita GDP (PCI), arable land (AL), population density (PD), and military expenditure (ME). The data for real GDP per capita, which is in constant US dollars, was calculated without including any deductions for the depreciation of fabricated assets, nor for loss or degradation of natural resources.

Data for openness (OPEN) was generated from the Penn World Tables 6.1 (PWT) online database, which is run by the Center for International Comparisons at the University of Pennsylvania (CICUP**)**. PWT uses Price Purchasing Parity to standardize its data across countries. Openness in the PWT is defined as imports plus exports divided by real GDP.

Empirical Results

In this section the results of the estimation and the measures pertaining to the validity of the model will be presented. We use two well-known corruption indices, the ICRG (International Country Risk Guide) and the CPI (Corruption Perceptions Index) in our estimation. This ensures that we can check for robustness of results across different indices.

Ordered Probit Model regression results

We first look at the results in Table III, which have been generated with the ordered probit model specified earlier (equation (1)).

Care in interpreting the results of ordered probit models is advised, as it is one of the least obvious models. Unlike conventional ordinary least squares (OLS), we do not interpret the coefficients of the independent variables with a direct relationship on the dependent variable. The coefficients represent the amount of change that is brought about by a unit change in the independent variable on the dependent variable's (hypothesized) underlying scale. The signs and the relative size of the coefficients are the first measures we look at to evaluate the results of the model.

In the case of the ICRG data set, signs of all coefficients are as expected, with the exception of military expenditure (ME), which unexpectedly shows a negative sign (i.e. a one unit increase in the percent of GDP used to finance military expenditure leads to an increment in the probability of the country being in a lower response category, or less corrupt). The amount of arable land (AL) to total land also reveals an unexpected sign. Importantly all the coefficients are small, testifying to the minimal impact of individual variables on the degree of corruption in a country.

The coefficients are all significant at the 5 percent level on the Z-table, except for the coefficient for Openness (OPEN). The coefficients for military expenditure (ME) and arable land (AL) are the largest among the independent variables. However, it would be unwise to read too much into these statistics for such a model. The difference between the log likelihood at iteration 0 (-363.73) is small when compared to the log likelihood at the last iteration 3 (-318.12), showing that the advantage of the model with independent variables, as compared to the null model, is negligible. The likelihood ratio shows that the probability of accepting the null hypothesis that the independent variables have no explanatory power is zero. The pseudo R^2 or McFadden R^2 shows a poor goodness of fit for the model at 0.12. The results do not vary much when the variable for arable land (AL) is dropped from the model, or when both arable land (AL) and population density (PD) are excluded. However, the coefficient for openness (OPEN) does become significant with the former specification. (Restricted model ϕ=0).

Table 3: Ordered Probit Model showing the effect of selected factors on corruption in the Asia-Pacific region
Latent variables: ICRG and CPI indices

		ICRG Index			**CPI Index**	
	(1)	(2)	(3)	(1)	(2)	(3)
PCI	0.000	0.000	0.000	0.000	0.000	0.000
	(-7.74)	(-8.25)	(-8.04)	(6.65)	(7.37)	(7.33)
OPEN	-0.002	-0.004	0.000	0.008	0.009	0.004
	(-1.04)	(-2.29)	(0.02)	(3.00)	(3.54)	(1.88)
ME	-0.105	-0.078	-0.081	0.816	0.806	0.317
	(-2.33)	(-1.78)	(-1.83)	(3.20)	(3.34)	(1.69)
AL	0.035			-0.075		
	(3.76)			(-4.10)		
PD	0.000	0.000		-0.001	-0.001	
	(2.30)	(2.76)		(-3.21)	(-3.31)	

No. of Obs.	217	220	220	95	98	98
Log Lik.	-318	-331	-335	-131	-145	-150
Psuedo R^2	0.13	0.11	0.10	0.30	0.24	0.22

Interestingly results generated with the TI dataset (equation 2) mirror the relationships obtained with those of the ICRG dataset (equation 1). As in the case of equation (1), military expenditure (ME) and arable land (AL) seem to share an unexpected relationship within the corruption index (CPI). The goodness of fit is much better than the results derived by using the ICRG dataset (R^2=0.30). The coefficients are also all significant at the 5 percent level, with the coefficients for military expenditure (ME) and arable land (AL) again proving to be the largest. Estimating the restricted model (ϕ=0, γ=0) depresses the significance levels for both openness (OPEN) and military expenditure (ME) and the goodness of fit in general.

Table 4: Ordered Probit Model (with correction for reverse causality) showing the effect of selected factors on corruption in the Asia-Pacific region
Latent variables: ICRG and CPI indices

		ICRG Index			**CPI Index**	
	(1)	(2)	(3)	(1)	(2)	(3)
PCI	0.000	0.000	0.000	0.000	0.000	0.000
	(-7.59)	(-8.11)	(-8.00)	(6.47)	(7.32)	(7.52)
OPEN	-0.002	-0.004	0.000	0.009	0.010	0.005
	(-0.90)	(-2.21)	(-0.22)	(3.01)	(3.69)	(2.77)
MELAG	-0.088	-0.060	-0.063	0.424	0.316	0.197
	(-1.99)	(-1.38)	(-1.45)	(2.36)	(1.92)	(1.22)
AL	0.035			-0.082		
	(3.81)			(-4.44)		
PD	0.000	0.000		0.000	0.000	
	(2.00)	(2.52)		(-2.50)	(-2.50)	
No. of Obs.	216	219	219	94	98	98
Log Lik.	-317	-330	-333	-131	-148	-151
Psuedo R^2	0.12	0.10	0.09	0.29	0.23	0.21

Having estimated the specified model, we now deal with the possibility of reverse causality running from the corruption indices (ICRG and CPI) to military expenditure (ME). It is often with the intention of indulging in rent seeking behavior or misuse of public funds that officials promote increased expenditure on large-scale opaque and secretive deals, such as military expenditure. The primary method to account for this problem is to introduce instrumental variables in the estimation. However, the properties of the instrumental-variable ordered probit estimator have not yet been studied thoroughly enough. Thus, we instead introduce a lag term to the identified variable military expenditure (ME). The logic here is that the current year's corruption, or corruption perception, cannot affect the previous year's military expenditure (ME). The results (Table IV), however, differ very little from our estimation without lag terms for the ICRG dataset. Pseudo R^2 is slightly lower, with all coefficients falling slightly.

However, the difference between the log likelihood at iteration 0 (-361.17) is small compared to the log likelihood at the last iteration 3 (-317.20), showing that the model with all explanatory variables does not possess much of an advantage over the null model. The results using the TI dataset echo those resulting from the estimating equation (1). However, a previously insignificant openness coefficient in our restricted model becomes significant on using lag variables in our estimation.

Importantly, the previous empirical literature linking corruption with per capita income and openness seem to be vindicated for both datasets (ICRG and TI), albeit the relationship between the variables seems weak when viewed by the small coefficients.

Ordinary Least Squares (OLS) regression results

The estimation of the same basic models using the ordinary least squares (OLS) method serves as a basis for comparisons between regression and ordered probit results. This allows us to see if the results are robust when applied to different estimation techniques. In order to facilitate this comparison we first 'normalized' the data, ensuring that each of the data series had a zero mean and standard deviation of one.

OLS results with the ICRG index (Table V) point to a better goodness of fit, showing 0.34 in the ICRG index and a high 0.71 for the TI index in the case of the unrestricted model. In terms of the signs of the coefficients, they are repeated from the ordered probit estimate for both the ICRG and TI indexes from Table 3. All coefficients are significant for both the ICRG and TI indexes, except for openness (OPEN) under the ICRG index in estimations (1) and (3). The results reveal that GDP per capita (PCI), arable land (AL) and population density (PD) seem to play the biggest role in explaining variations in the degree of corruption in a country in this index.

Table 5: Regression showing the effect of selected factors on corruption in the Asia-Pacific region

Dependent variables: ICRG and CPI indices

		ICRG Index			CPI Index	
	(1)	(2)	(3)	(1)	(2)	(3)
Constant	-0.006	-0.010	-0.024	-0.043	-0.001	0.071
	(-0.13)	(-0.19)	(-0.44)	(-0.68)	(-0.01)	(1.06)
PCI	-0.503	-0.552	-0.460	0.652	0.817	0.713

	(-8.52)	(-9.23)	(-8.96)	(8.67)	(10.0)	(10.5)
OPEN	-0.123	-0.240	-0.007	0.265	0.434	0.220
	(-1.24)	(-2.45)	(-0.13)	(1.95)	(2.80)	(1.80)
ME	-0.142	-0.113	-0.120	0.231	0.262	0.085
	(-2.51)	(-1.96)	(-2.05)	(1.86)	(1.84)	(0.71)
AL	0.208			-0.366		
	(3.75)			(-5.74)		
PD	0.234	0.284		-0.433	-0.530	
	(2.40)	(2.87)		(-2.08)	(-2.18)	
No. of Obs.	217	220	220	95	98	98
F-statistic	23	25	29	48	39	48
$R^{2\,(adj.)}$	0.34	0.30	0.28	0.71	0.61	0.59

The TI index, on the other hand, allows openness (OPEN) to play a larger role in explaining variations in the degree of corruption in a country. Estimations (2) and (3) under the TI index reveal that the goodness of fit in equation (2) falls, with the exclusion of arable land (AL) and population density (PD), from the model. The significance of the coefficient attached to military expenditure (ME) in particular is reduced with the restricted models used in estimations (3). Another notable change is the larger negative coefficients for population density (PD) for estimations (1) and (2) in the CPI index. Thus, the CPI index shows a negative effect on corruption with higher population density when using OLS estimation. In general, the trends reported in Table 3 using the Ordered Probit Model are repeated with the use of linear regression for both equation (1) and (2), albeit with a better goodness of fit.

The approach employing lag variables to account for the endogenity problem is also attempted here. The results (Table 6) differ very little from the regression results presented in Table 5. There is, however, a slight fall in the explanatory power of the model, except for estimation (2) using equation (2), as seen by the adjusted R^2. The coefficients and significance of several variables also falls on introducing lag variables into our estimation, particularly the lag variable itself (MELAG). It would appear from these results that the suspected reverse causality between corruption indices (ICRG and CPI) and military expenditure (ME) is not as serious as initially thought. Hence, the inclusion of lag variables in our models does not bring about much change in the results. However, it must be remembered that the coefficient of military expenditure (ME) showed an unexpected sign in all the estimations. Thus, any possible reverse causality is plausibly negated by the seemingly unexpected effect that higher military expenditure has on the corruption indices.

Table 6: Ordinary least squares regression with time lags
Dependent variables: (ICRG and CPI indices)

	ICRG Index			CPI Index		
	(1)	(2)	(3)	(1)	(2)	(3)
Constant	0.003	0.001	-0.011	-0.021	0.033	0.065
	(0.06)	(0.01)	(-0.21)	(-0.34)	(0.50)	(1.00)
PCI	-0.493	-0.542	-0.459	0.627	0.793	0.712
	(-8.33)	(-9.05)	(-8.90)	(8.49)	(9.91)	(10.8)
OPEN	-0.110	-0.232	-0.020	0.267	0.468	0.267
	(-1.10)	(-2.38)	(-0.36)	(1.97)	(3.06)	(2.66)
MELAG	-0.124	-0.091	-0.098	0.142	0.087	0.035
	(-2.21)	(-1.59)	(-1.70)	(1.56)	(0.85)	(0.36)
AL	0.211			-0.383		
	(3.76)			(-5.96)		
PD	0.206	0.258		-0.316	-0.341	
	(2.20)	(2.62)		(-1.73)	(-1.73)	
No. of Obs.	216	219	219	94	98	98
F-statistic	22	24	28	48	38	49
$R^{2\ (adj.)}$	0.33	0.29	0.27	0.72	0.60	0.60

Conclusions

This article was undertaken to verify the prior academic work that links openness, as defined by the ratio of volume of international trade to a country's GDP, with a reduction in corruption (Krueger, 1974,and Torrez, 2005) for the Asia-Pacific region. Torrez's finding that the relationship between corruption and openness was not robust across different indices of corruption was disproved in the case of the Asia-Pacific region. However, the analysis revealed a weak relationship between openness and corruption for the ICRG index estimations (1) and (3) across all estimation methods. Nevertheless, the coefficient for openness was significant when using the CPI as the dependent variable.

The other objective of this article was to analyze the second most accepted idea or notion or perception that associates a rise in per capita GDP with a reduction in corruption for the Asia-Pacific region. This idea was supported by the results of this study, although the strength of the relationship between per capita GDP and corruption depends on the index used. Its effect seems to be negligible, given the low coefficient values in the ordered probit estimations. However, the regression results seem to demonstrate a bigger impact of per capita GDP on corruption. Importantly, the nature of the relationship was robust across the different estimation techniques used.

The expected nature of the relationship between corruption and military expenditure did not materialize, irrespective of the estimation technique or index used. This was also the case for the other variable, arable land (AL). Thus, estimations using data on corruption will give differing results depending on the dataset used. Time lags to correct for reverse causality made little difference in the estimations, with the exception of a lowering in goodness of fit for the estimations, making several variables insignificant. This was due to the unexpected relationship military expenditure (ME) shared with corruption. Ordinary Linear regression (OLS) estimates give slightly better results with a higher goodness of fit (R^2).

Therefore, the countries of the Asia-Pacific region can negate the effects of corruption with greater openness in their economies, increasing economic growth with an emphasis on increasing distribution, and more effective family planning to reduce populations in the long term. Better regional dispersion of populations and accompanying decentralization could also be effective in reducing corruption in the short and medium term.

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