CORRUPTION AND CENTRAL BANK INDEPENDENCE: EVIDENCE FROM DEVELOPING COUNTRIES

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Abstract

During the 1990's, increasing attention has been devoted to combat corruption as a major international problem. This paper investigates the role of central bank independence as a kind of macroeconomic reform to alleviate the detrimental impacts of corruption, especially in developing countries, bearing the worst consequences. The empirical analysis is based on data from a sample of 18 developing countries in the period 1990 – 1998. The association between central bank independence and lower corruption is ascertained by using cross-section regression technique. Although some caution is needed owing to the data limitations, the evidence suggests the central bank independence be, at least, regarded as one of the necessary conditions to combat corruption.

I. Introduction

For decades, corruption has been accepted as a seemingly inevitable fact of life which removes government-imposed rigidities and "oils the mechanism" or "greases the wheels" of government. At the same time there has never been any serious doubt that corruption has been one of the major impediments to development.

In recent years, especially over the last decade, increasing attention has been devoted to corruption as a major international problem that undermines economic, political and social development. While, in general, corruption all over the world has mostly common features, causes, and consequences, certain characteristics of a country's macroeconomic performance may lead to higher risks of corruption.

Empirical research on corruption can be divided into two categories. The first focuses on the causes and the determinants of corruption. Various studies have shown that the main factors affecting the corruption are the absence of competition, policy distortions, political systems, the level of public

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sector wages, rule of law, the availability of natural resources, an inefficient system of customs taxes, and subsidies, multiple exchange rate system, an extensive system of licenses and permits, incorrect banking operations involving the granting of credits and money laundering, lack of transparency; (Lambsdorf, 1999; Van Rijckegham and Weder, 1997; Leite and Weidmann, 1999; Gupta, DeMello and Sharan, 2000; Tanzi, 1998). The second focuses on the consequences of corruption. These studies have analyzed the impact of corruption on, among other things, investment, GDP, Institutional quality, government expenditure, poverty and income inequality. They have shown that corruption is more likely to have detrimental impact on macroeconomic performance of the countries[1].

In order to alleviate the harmful impacts and consequences of corruption on economy, it seems that the fight against corruption as mentioned by Tanzi (1998) may not be cheap and cannot be independent from the reform of the state. In this regard the reform toward more independent central bank and its impact on corruption especially in developing countries where the corruption discriminates economies against the poor and deepens poverty, deserves to be studied.

The present paper deals with the relationship between corruption and central bank independence in a sample of developing countries for which data on corruption and central bank independence indexes are available. To my knowledge, this is the first cross-country empirical analysis relating to central bank independence with corruption.

The paper is organised as follows: Section II deals with the importance of corruption around the world with an emphasis on the position of developing countries. In Section III, the importance of central bank independence and the channels through which it is likely to be associated with less corruption is discussed. In Section IV the empirical cross-sectional analysis of the relationship (association) between central bank independence and corruption is carried out using the available data for a sample of developing countries. Section V concludes.

II. The Importance of Corruption around the World

There is no comprehensive definition of corruption in the literature. Nevertheless, the most popular and simplest definition of corruption is "the abuse of Public Office for private gain" (Tanzi, 1998; Bardham, 1997). According to this definition one can conclude that everyday corruption most often occurs in the Public Sector of any economy, but with a different degree. Like some macroeconomic variables such as inflation, corruption can be broken up into moderate corruption, high corruption and super or hyper corruption[2].

While the actual corruption in terms of bribes paid is difficult to measure because of its secrecy and the frequent supports of some official and powerful interests, there are several indirect ways of measuring corruption. The most popular measure, which has been introduced by Transparency International[3] and has also been used in this paper, is the Corruption Perception Index (CPI)[4].

Table 1 shows the CPI indexes for 99 countries in 1999 reported by Transparency International[5]. The average CPI for the sample of 99 countries in 1999 is 4.6 compared to 4.89 in 1998, 5.67 in 1997, 5.35 in 1996, and 5.93 in 1995, indicating a somewhat increasing perception in corruption on average around the world[6]. As it is seen from data in Table 1, the corruption index tends to be higher in developed countries as compared with developing countries, indicating more perceptions of corruption in these countries. It is also interesting that transition countries also suffer from higher perceptions of corruption due to their lower CPI[7].

III. Corruption and Central Bank Independence

Among the main important causes of corruption are factors such as the incorrect management of special public funds banking operators involving the granting of credits, loans, issuing bank warranties and guarantees lack of Transparency of the work

Table 1. The 1999 Corruption Perceptions Index (CPI)

Country Rank	Country	1999 CPI Score	Country Rank	Country	1999 CPI Score	Country Rank	Country	1999 CPI Score
1	Denmark	10.0	34	South Africa	5.0	67	Romania	3.3
2	Finland	9.8	35	Tunisia	5.0	68	Guatemala	3.2
3	New Zealand	9.4	36	Greece	4.9	69	Thailand	3.2
4	Sweden	9.4	37	Mauritius	4.9	70	Nicaragua	3.1
5	Canada	9.2	38	Italy	4.7	71	Argentina	3.0
6	Iceland	9.2	39	Czech Republic	4.6	72	Colombia	2.9
7	Singapore	9.1	40	Peru	4.5	73	India	2.9
8	Netherlands	9.0	41	Jordan	4.4	74	Croatia	2.7
9	Norway	8.9	42	Uruguay	4.4	75	Ivory Coast	2.6
10	Switzerland	8.9	43	Mongolia	4.3	76	Moldova	2.6
11	Luxembourg	8.8	44	Poland	4.2	77	Ukraine	2.6
12	Australia	8.7	45	Brazil	4.1	78	Venezuela	2.6
13	UK	8.6	46	Malawi	4.1	79	Vietnam	2.6
14	Germany	8.0	47	Morocco	4.1	80	Armenia	2.5
15	Hong Kong	7.7	48	Zimbabwe	4.1	81	Bolivia	2.5
16	Ireland	7.7	49	El Salvador	3.9	82	Ecuador	2.4
17	Austria	7.6	50	Jamaica	3.8	83	Russia	2.4
18	USA	7.5	51	Lithuania	3.8	84	Albania	2.3
19	Chile	6.9	52	South Korea	3.8	85	Georgia	2.3
20	Israel	6.8	53	Slovak Republic	3.7	86	Kazakhstan	2.3
21	Portugal	6.7	54	Philippines	3.6	87	Kyrgyz Republic	2.2
22	France	6.6	55	Turkey	3.6	88	Pakistan	2.2
23	Spain	6.6	56	Mozambique	3.5	89	Uganda	2.2
24	Botswana	6.1	57	Zambia	3.5	90	Kenya	2.0
25	Japan	6.0	58	Belarus	3.4	91	Paraguay	2.0
26	Slovenia	6.0	59	China	3.4	92	Yugoslavia	2.0
27	Estonia	5.7	60	Latvia	3.4	93	Tanzania	1.9
28	Taiwan	5.6	61	Mexico	3.4	94	Honduras	1.8
29	Belgium	5.3	62	Senegal	3.4	95	Uzbekistan	1.8
30	Namibia	5.3	63	Bulgaria	3.3	96	Azerbaijan	1.7
31	Hungary	5.2	64	Egypt	3.3	97	Indonesia	1.7
32	Costa Rica	5.1	65	Ghana	3.3	98	Nigeria	1.6
33	Malaysia	5.1	66	Macedonia	3.3	99	Cameroon	1.5
							AVERAGE	4.1

Source: Transparency International.

NOTE: Data refer to perception of corruption ranging from 10 (highly clean) to 0 (highly corrupt).

and transactions of the various governmental institutions and the proper channeling of information between different sectors of the economy and money laundering are playing major roles. In this regard economic reforms leading to more independent central banks with powerful instrument of monitoring and supervising the money and banking system in the economy can play an important role to combat corruption[8].

Recently there has been a revival of interest in the academic literature on the role of transparency in monetary policy-making. The widely perceived trend towards greater transparency can be related to decisive moves towards greater central bank independence in many countries over the last decade or so. In this context, it is widely argued that transparency facilitates accountability, which in turn can be regarded as an ingredient of central bank independence in a democratic society (Cf. Winkler, 2000). Central bank independence is also useful in combating one of the highest super corruptions in the form of money laundering. Efforts to curb money laundering through the independence of central bank can also help to reduce corruption. The linkage is relatively clear. Bribe takers must find safe international financial channels through which they can bank their windfall gains. The bribe givers may also assist the bribe takers to establish safe monetary channels and launder the money. It is very difficult to estimate the scale of money laundering but an indication was provided in February 1998, in a speech by Michel Comdessus, the IMF's managing director at the time, in which he noted that "the estimates of the present scale of money laundering transactions are almost beyond imagination at 2-5% of global GDP" (Githongon, 2000).

Recently central bank independence has been considered a major issue in debates about institutional reforms designed to improve economic performance. Many researchers have argued that when independence is coupled with a price stability objective, economic performance appears to improve. Not only is inflation and government budget deficits lower, but there is evidence that real growth is higher[9]. It is perhaps for this reason that the requirement of the treaty on European Union (Maastricht Treaty) is of great importance. The Treaty requires an independent central bank as a precondition for membership in the Economic and Monetary Union (EMU). Central bank independence was also one of the necessary economic conditions for members of the Euro-area[10].

Table 2 shows the corruption perceptions indexes for the Eleven[11] Euro states for 1998 and 1999 reported by Transparency International. Comparing the 1998 figures with that reported in 1999 indicates that the Euro Countries tend to hold their positions although some minor changes in particular are shown. The average CPI score is somewhat higher in 1999 as compared with 1998 indicating an improvement in perceptions of corruption in these countries.

Table 2. The 1998 – 99 Corruption Perceptions Index (CPI) for members of the Euro – area.

Country	1998 CPI Score	1999 CPI Score
Austria	7.5	7.6
Belgium	5.4	5.3
Finland	9.6	9.8
France	6.7	6.6
Germany	7.9	8
Ireland	8.2	7.7
Italy	4.6	4.7
Luxembourg	8.7	8.8
Netherlands	9	9
Portugal	6.5	6.7
Spain	6.1	6.6
Average	7.29	7.34

Source: Transparency International.
Notes: Data refer to Perception of Corruption ranging from 10 (highly clean) to 0 (highly corrupt). The data for members of the Euro-area has been rearranged and the average score for these countries has been computed by the author.

It should be noted that comparing the CPI data for the eleven members of the Euro-area enjoying a high degree of central bank independence with non-Euro members leads to the result that the CPI is significantly higher for the former countries[12]. This in itself is an indication that countries with higher degree of central bank independence tend to have lower corruption in the form of higher CPI[13].

Classifying central banks according to their degree of independence is, of course, not straightforward. Most authors provide no clear definition of central bank independence. According to Friedman (1962), central bank autonomy refers to a relation between the central bank and the government that is comparable to the relation between the judiciary and the government. Some researchers believe that central bank independence relates to three areas in which the influence of government must be either excluded or drastically curtailed: independence in personnel matters, financial independence, and independence with respect to policy[14].

Grilli, Masciandaro, and Tabellini (1991) constructed an index measuring the independence of the central bank that reflects both political and economic independence[15]. Political independence is defined essentially as the ability of the central bank to select its policy objectives without influence from the government. This measure is based on factors such as whether or not its governor and the board are appointed by the government, the length of their appointments, whether government representatives sit on the board of the bank, whether government approval for monetary policy decisions is required and whether the "price stability" objective is explicitly part of the central bank rule.

Economic independence is defined as the ability to use instruments of monetary policy without restrictions. The most common constraint imposed on the applying monetary policy is the extent to which the central bank is required to finance government deficit[16].

It should be noted that although different indexes of measuring the degree of legal central bank independence are based on a similar approach, it is remarkable that the various investigations undertaken in this area show considerable agreement when it comes to assessing the degree of independence of different central banks, but they sometimes show very different outcomes[14].

Cukierman (1992) develops a non-legal measure for central bank independence on the basis of answers to a questionnaire under "qualified individuals in various central banks". He gives both an unweighted and weighted variant of this indicator. The questionnaire examined five issues: (1) legal aspects of independence; (2) actual practice when it differs from the ruling of the law; (3) monetary policy instruments and the agencies controlling them; (4) intermediate targets and indicators; and (5) final objectives of monetary policy and their relative importance[18].

Cukierman, Webb and Neyapati (1992) have also developed a measure for central bank independence based on the actual average term of office of central bank governors in a number of countries from 1950 to 1989. This indicator is based on the presumption that a higher turnover of central bank governors indicates a lower level of independence[19].

Cukierman and Webb (1995) have gone one step further. They argue that the frequency of transfers of central bank governors reflects both the frequency of political change (shift in regime, for example, or in the head of government) and the percentage of political changes that are followed by changes in the governorship of the central bank. They therefore develop an indicator of the political vulnerability of the central bank, which is defined as the percentage of political transitions that are followed within six months by the replacement of the central bank governor.

It can be argued that based on the foregoing analysis some ambiguities still surround the existing indexes of central bank independence. They are often incomplete and are not real indicators of actual independence. This does not, however, mean that they are uninformative[20], but it does imply, as mentioned earlier, that their use should be supplemented by judgement of the problem under consideration and with caution[21].

IV. Empirical Evidence from Developing Countries

In this section, the empirical analysis of the association between corruption and central bank independence is carried out using the available data for a sample of 18 developing countries in 1995 for which both the corruption and central bank independence indexes were available. We have used Cukierman's actual index[22] for central bank independence and the data for corruption index were those reported by the Transparency International for our sample of developing countries[23].

Table 3 presents the cross-sectional[24] weighted least squares estimated regression results. The central bank independence index variable has the expected sign and is statistically significant at 10% level in all models indicating a negative association between central bank independence and corruption in our sample of developing countries. In other words, the higher the degree of central bank independence, the higher the CPI which in turn indicates lower corruption in the countries. Therefore, all models suggest that the countries tend to have a higher degree of the central bank independence perceived as being less corrupt[25].

Table 3. Corruption and Central Bank Independence: Cross-section weighted least squares (WLS) estimated regression results, 1995 (Dependent Variable: Corruption)

	Models with different weighting series		
	(1)	(2)	(3)
Constant	3.05* (11.12)	4.03* (4.21)	4.33* (4.19)
Central bank independence index	0.337* (12.01)	0.294*** (1.77)	0.657** (2.17)
Inflation	-0.0033* (-23.66)	-0.0044** (-2.77)	-0.0115** (-2.32)
No. of observations	18	18	18
Adjusted R-squared	0.999	0.772	0.790
F-test	10781.7	29.7	33

Note: (*), (**) and (***) denote, respectively, significance at the 1%, 5% and 10% levels. The numbers in parentheses are hetroscedasticity-consistent t-statistics using different weighting series (the weighting series in models (1), (2) and (3) are, respectively, inflation, central bank independence index, and corruption perceptions index (CPI)). In all models, a high score on the CPI indicates a low level of corruption and a high score on the central bank independence indicates a high level of independence. Model (1) with a higher adjusted R-squared may be preferred to others.

The explanatory variables account for 77 to 99 percent of variation in corruption index across countries, depending on the weighting series used to eliminate the hetroscedasticity[26]. The F-test is significant at classical confidence levels for all models[27].

V. Concluding Remarks

Comprehensive national and international policies and reforms are required to combat corruption, which is a multi-dimensional phenomenon.

The main purpose of the present paper was to introduce the role of central bank independence as only a kind of macroeconomic reform to alleviate the detrimental impacts of corruption especially in developing countries, bearing the worst consequences.

This paper has shown that corruption is associated with lower central bank independence for a sample of developing countries in 1995. Although some caution is needed, owing to the data and indexes limitations, the evidence reported in this paper suggests - but by no means conclusive - that countries with lower degree of central bank independence are perceived as being more corrupt.

The key policy implication of this paper is that, other things being equal, reforms aimed at increasing central bank independence will tend to reduce corruption. Therefore, the central bank independence may at least be regarded as one of the necessary conditions[28] to combat corruption.

Notes:

[1] See for example, Mauro (1995), Tanzi and Davoodi (1997), Gupta, Davoodi and Alonso-Terme (1998). It should be noted that whether corruption causes the other variables or is itself the consequence of certain characteristics is difficult to assess. I think it is useful to observe the correlation and association between corruption on the one hand, and other variables on the other hand. It is difficult to derive clear arguments with respect to causality in this regard.

[2] Moderate corruption involves relatively minor

bribes or gifts (for more details on difference between bribes and gifts see Tanzi, 1998 p. 565) where the bribe taker is a relatively minor official. For example, paying a policeman $2 to ignore some moving violation, which cost $20, or more. High corruption involves businessman and government officials of a relatively important rank and the bribes are significant. For example, bribes paid to officials on Public Projects. Super corruption involves huge amounts of money so that they may even have macroeconomic consequences such as higher inflation. This kind of corruption usually involves an important political figure within which the transaction takes place. For example, money printing to finance dummy projects.

[3] Transparency International (TI) is a globally active non-govenmental organisation (NGO) to increasing government accountability and curbing both international and national corruption. TI was created just as the world-wide change was about to take off. It encouraged governments, international organisations like UNDP and especially the World Bank, the IMF that are important players in many developing countries, OECD as well as regional development banks to use their potential in an unambiguous anti-corruption policy. For example, the World Bank anti-corruption activities fall under four sections: 1) Preventing corruption on the World Bank's projects; 2) Helping countries reduce corruption; 3) Mainstreaming anti-corruption in the bank's operational work; 4) Participating in international efforts to reduce corruption. Also the OECD's antibribery convention in International Business Transactions was signed by representatives of 29 member governments on December 17, 1997, in effect since February 15, 1999 makes it a crime to offer, promise, or give a bribe to a foreign public official in order to obtain or retain institutional business deals. It also puts an end to the practice according to tax deductibility bribe payments made to foreign offficials. Dr Peter Eigen, Chairman of Transparency International, has suggested that the World Trade Organisation (WTO) should observe and follow up on the anticorruption work done by the OECD and forge a tripartite alliance against corruption with the IMF and the World Bank. See Githongo (2000) for more details. TI has also sponsored the International Anti-Corruption Conferences (IACC) a series of biannual conferences which suggested from a first meeting at the Hong Kong in late 1981 between several International agencies. The first conference held in Washington in 1983 attracted some 20 agencies from 13 countries, while the 9th conference which once again brought together practitioners and academics to exchange information and experiences on strategies and methods for combating corruption in developing and developed countries held in South Africa attracted about 1600 professionals and activists from 135 countries around the world.

[4] The TI corruption perceptions index (CPI) ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians. It is a composite index, drawing on 17 different polls and surveys from 10 independent institutions carried out among business people, the general public and country analysts. CPI varies from 0 (highly corrupt) to 10 (highly clean). TI focuses on corruption in the public sector and also defines corruption in a similar way as the abuse of public office for private gain. It should also be noted that TI has always believed that bribery is a two-way street. If there are those who accept bribes, there are also those, equally involved, who pay bribes. The CPI reflects only one side of the picture - that of receiving governments and their officials. The CPI does not rank countries from which the bribe givers are most likely to originate. TI is now attempting to develop a Bribe Payer Index (BPI) to balance the perceptions created by the CPI. See TI website for more details. There is also another subjective index to measure corruption called the International Country Risk Guide Index (ICRGI). It measures corruption in a country as perceived by foreign investors. It varies from 0 (highly corrupt) to 10 (highly clean). "Corruption is defined as the likelihood of a government official to demand special payments", in the form of bribes connected

to trade licenses and....See Knack and Keefer (1995) for more details.

[5] TI also reported the CPI figures for 1995 - 1998. The inclusion of 99 countries in 1999, compared to 85 in 1998, 52 in 1997, 54 in 1996, and 41 in 1995 indicates the commitment of TI to raise public understanding of corruption around the world. For CPI data in 1995 - 1998 see Tanzi (1998) or TI website.

[6] As mentioned earlier, the number of countries were not the same in different years. Comparing the 1995 figures with those reported in1999 for the countries covered in both years shows high positive correlation coefficient which indicates that countries tend to hold their positions although some significant changes in particular countries are seen.

[7] It should be emphasized that it is absolutely not true to conclude that the country with the lowest score in the CPI is the world's most corrupt country. In fact, TI tries to convince journalists and others that this is a false interpretation because, there are more than 200 independent nations in the world and the CPI can only rank up to 99, due to the lack of sufficient reliable data for all countries. Also, the CPI, as mentioned earlier, is based on polls which solely reflect opinions. A single but widely reported base of corruption may easily change perceptions in a particular country in a special year, and lead to an index which may not exactly determine the extent of corruption in that country. Therefore, any conclusion based on CPI data (including the present paper) must be considered with caution.

[8] It should be noted that since corruption is a multi-dimensional phenomenon, it requires comprehensive policies and reforms in macroeconomic performance of the countries to combat with. Economic reforms to tailor the role of government such as liberalisation and deregulation, suitable privatisation and opening of trade regimes to create competition, decentralisation of the government and its functions particularly in economic field, tax collections and local governance, could be mentioned as some examples.

[9] Due to the favourable impacts of central bank independence on macroeconomic performances of both developing and developed countries some researchers suggested that central bank independence come to top of the list of institutional reforms designed to safeguard the stability of money and macroeconomics. See for example Issing (1993), Hutchison and Walsh (1998), Pollard (1993), Sikken and De Haan (1998), Cukierman, Webb and Neyapti (1992), Alesina and Summers (1993), Jafari-Samimi and Ahmadi (2000).

[10] The members of the Euro-area had to bring their economies closer together (this is known as achieving convergence) and central bank independence has been one of the criteria for that purpose. The national banks in the members states did not disappear: they along with the European central bank, formed together, the European system of central banks (ESCB), which became operational on 1 January 1999. See also European Communities (1997) for more details. I should also add that historically, the European countries have had very different approaches to central bank independence. Evidence shows that the northern European countries such as Germany, Switzerland and, to a lesser extent, the Netherlands, have histories of strong independent central banks, but that countries such as France, Italy, Spain and the UK do not. See Temperton (1997) for further details.

[11] Greece will also join the Euro In January 2001.

[12] The average CPI score for non-Euro member countries in 1998 was 4.53 compared to that of 7.29 for the Euro-members. The difference was statistically significant on average at a 1% level.

[13] As it is observed in Table 1, compared with other countries, the former socialist countries have lower CPI indicating more corruption. Recently the creation of independent central banks in many of these countries has been part of a more general attempt of these countries to create the institutional framework needed for the orderly functioning of a market economy.

[14] Personnel independence refers to the influence

the government has in appointment procedures. Financial independence refers to the ability given to the government to finance its expenditure either directly or indirectly through central bank credits - policy independence refers to the maneuvering room given to the central bank in the formulation and execution of monetary policy. See for example Hasse (1990) for more details.

[15] The index used by them is the sum of their indicators for political and economic independence and ranges from 3 to 13.

[16] There are other legal – as opposed to non-legal or actual – measures of central bank independence, as developed by Alesina (1988, 1989), Eijffinger and Schaling (1993), and Cukierman (1992) respectively. The measures of Alesina and Eijffinger – scaling range from 1 to 4 and 1 to 5 respectively. The index of Cukierman varies from 0 to 1. The higher the score for the various indexes is, the more independent the central bank will be.

[17] According to the measure used by Grilli, Masciandaro and Tabellini, for example, the Greek central bank has little autonomy whereas according to Cukierman's (1992) index, it is relatively independent. Therefore, any conclusion in this regard should be treated with caution.

[18] It should be noted that an obvious methodological drawback of the questionnaire is that central bankers may benefit from providing a too positive impression of their independence. It is therefore doubtful that the personnel of central banks are the most appropriate recipients for a questionnaire on central bank independence. The difference between the legal - independence measure and the indicator based on the questionnaire gives some impression of the degree to which central bankers overestimate their independence. For example, the score for Cukierman's unweighted legal-independence for Italy is 0.22, whereas the score of questionnaire is 0.76.

[19] One can argue that a long-term in office may also indicate a low level of independence, because a relatively subservient governor will tend to stay longer in office than will a governor who stands up to the executive branch. Therefore, the main difficulty in examining the question of central bank independence is measuring it in different countries.

[20] Resistance to making the central bank independent may reflect the intention of reserving access to an illegal money creation and the risk of corruption to policy makers which in turn violates the government credibility.

[21] Some researchers have suggested that the measures of legal independence may be a better proxy for independence in industrial countries than in developing countries. See for example Eijffinger and De Haan, 1996, p. 28.

[22] Since the corruption perceptions index ranges from 10 (highly clean) to 0 (highly corrupt) while the Cukierman index for central bank independence varies from 0 (highly dependent) to 1 (highly independent) in order to create a more comparable data, the Cukierman index was rescaled by multiplying it by 10, therefore our new version of Cukierman index varies from 0 (highly dependent) to 10 (highly independent). It should also be noted that there were 44 developing countries in the original sample of Cukierman but CPI index was reported for only 18 of these countries in 1995 (a year which was nearer to the Cukierman's data).

[23] The cross-sectional data of the following developing countries were available and used in the present paper: Greece, Chile, Turkey, Philippines, Portugal, Argentina, Malaysia, Mexico, India, Singapore, South Korea, Indonesia, Columbia, Thailand, South Africa, Hungary, Pakistan, and Brazil.

[24] It should be noted that the cross-sectional estimation does not capture the time dimension of the relationship between corruption and central bank independence. However, measures of central bank independence are likely to vary little over time, they are generally poor explainers of developments in economic variables within countries. Therefore, most empirical studies on the consequences of central bank independence are cross-sectional. It should also be noted that despite the minor changes of the corruption perceptions indexes over time,

comparing the 1995 – 1998 CPI data for our sample of developing countries, shows a high correlation between the CPI in different years which indicates that these countries tend to hold their positions. The following is the correlation coefficients matrix between CPI's for 1995 – 1998:

$$r = \begin{bmatrix} 1 & 0.918 & 0.848 & 0.886 \\ & 1 & 0.951 & 0.941 \\ & & 1 & 0.976 \\ & & & 1 \end{bmatrix}$$

[25] As mentioned earlier (see note number 1) we are interested in the association and the sign of relationship between corruption and central bank independence and not the possibility of reverse causality.

[26] The inflation variable used as a control variable also supports the positive association between inflation (lower real wage) and corruption found by some researchers. It should be noted that despite the association between inflation and central bank independence found by some studies, which could cause multicollinearity problem, we have found no serious and significant multicollinearity in our estimated models.

[27] It should be noted that the estimated regression models can be used to approximately estimate the corruption index for other developing countries for which the Transparency International did not report their CPI's in 1995. For example, inserting the values for central bank independence index and inflation rate for Iran in our models, we got an average CPI of 4.77 for this country in 1995.

[28] It should be emphasised that independence of central bank is by no means a sufficient condition to combat corruption. It is not even a sufficient condition to ensure the maintenance of the value of money in a "society of excessive demands".

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