

Quantifying corruption by a human capital earnings equation

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Abstract This paper uses a human capital earnings equation to quantify administrative corruption in the public sector. Regression analyses are conducted based on information from surveys administered to public officials in Albania. After accounting for officials' characteristics, e.g., schooling, experience, gender, type of agency, and public and private sectors' features, we deduce that the administrative corruption was on average $2.6\times$ the officials' current salary in Albania, which is equivalent to 16.7% of the country's GDP.

Keywords Corruption · Human capital earnings · Albania

JEL Classifications C21 · D73 · J24

1 Introduction

The current literature on corruption includes empirical cross-country analyses and surveys demonstrating perceived corruption's macro-level harmful impact on economic, political and social outcomes in a country.¹ Yet, the literature on corruption is missing the micro-analyses of administrative the corruption because of corruption's clandestine nature.² In this paper, we attempt to shed light on this difficult task. We introduce a new approach to quantify administrative corruption in

¹ Bardhan (1997), Gupta and Alone-Terme (2002), Knack and Keefer (1995), Klitgaard (1998), Mauro (1997), Tanzi and Davoodi (1997), and World Bank (2000).

² Recently published work of Gorodnichenko and Sabirianova (2007) is a rare exception.

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a country as a percent of its gross domestic product (GDP) by utilizing the human capital earnings equation, based on human capital theory.³

The macro-level studies of the effect of corruption conclude that corruption has a harmful effect on countries. Corruption negatively impacts the income growth of the poor (Gupta and Alonse-Terme 2002; You and Khagram 2005), and corruption decreases productivity within a country (Lambdsdoorf 2003a). The perception of corruption by outside investors may also discourage FDI and other capital inflows (Mauro 1997; Lambdsdoorf 2003b; Wei 2000).⁴ The course of privatization in highly corrupt countries tends to be less efficient than in countries that control corruption, fostering an environment conducive to monopolies (Bjorvatn and Soreide 2005). Researchers have also looked at macro-level characteristics of countries with corruption. Corruption is prevalent in countries that have a large public sector (Mauro 2002)⁵ have poor governance (Rose-Ackerman 2004), and tend to lack political and civil rights (Harms and Ursprung 2002). Countries with an unstable legal administration and unstable markets, tend to help the growth of corruption (Lambert-Mogiliansky 2002). All of these country characteristics are common among transitioning economies.

A recent literature survey of corruption in Africa from 1990–2001 found a majority of the studies focused on political, or macro-level, corruption rather than administrative, or micro-level, corruption (Onyanha and Ocholla 2004). Furthermore, the micro-level literature that exists doesn't quantify administrative corruption but rather indicates its existence (and frequency): the rate of bribery between private citizens and public officials in certain transition countries (Grodeland et al. 1998); the perpetual cycle of administrative corruption which occurs because those who can end bribery are also those who demand bribes (Hessel and Murphy 2004); and the resignation felt by all those who must pay bribes for access to services (Mauro 2002). Additionally, this literature has shown that administrative corruption inhibits growth and fosters citizens' distrust of the public sector (Caiden 1988). Such administrative corruption also has a negative impact on the political system and long-term sustainable economic development by undermining the rule of law and good governance (Karklins 2002).

If corruption consisted only of bribery, quantification would not be difficult. However, Transparency International (2005) and other experts agree that bribery also exists in the form of gifts and favors; quantifying these bribes becomes more difficult. Accordingly, in this paper, we estimate administrative corruption in different public organizations of a country by utilizing an indirect approach. We focus on the difference between civil servants' current salaries and their willing-to-accept salaries for a comparable job in the private sector. Specifically, we apply the human capital earnings equation by using civil servants' education, experience, gender, place of work, and current and expected salary information from a recently

³ For details, see Becker (1962, 1964), Mincer (1958, 1962, 1974), and Schultz (1960, 1961).

⁴ However, Egger and Winner (2005) have noted a positive relationship between corruption and FDI in their empirical cross-country analyses.

⁵ Graeff and Mehkopf (2003) point out that some regulation from the public sector can help to reduce corruption and that a large public sector in a rich country tends to have a lower level of corruption.

conducted survey of public officials in Albania. After accounting for the officials' characteristics we deduce administrative corruption averaged 257% of officials' current salary in Albania, which approximately corresponds to 16.7% of the GDP.

2 Methodology and model specification

In analyzing corruption, the World Bank has distinguished between state capture, where laws and policies are designed to benefit a few; and administrative corruption, where existing laws and policies are executed or implemented in distorted ways to provide advantages to either state or non-state actors through illicit and non-transparent provision of private gains (e.g. bribes) to public officials (World Bank 2000). Examples of administrative corruption include "speed money" paid by citizens or businesses to expedite processes such as obtaining licenses, and fudging recruitment so that a particular candidate is selected.⁶

2.1 Human capital earnings model

We use a human capital earnings model, based on human capital theory, to quantify administrative corruption. This theory suggests that an employee's earnings depend on productivity, and productivity depends on the knowledge and skills necessary to perform the job. Such knowledge and skills may be acquired from schooling (formal education) and job experience. Employees with more schooling will be more productive than employees with less schooling. Job experience also increases the productivity of a worker (Berndt 1991). Therefore, according to the human capital theory, wages depend on productivity, which depends on the employee's schooling and the job-experience. However, other non-economic factors, such as gender and place of employment, also affect wages. Accordingly, in the public sector, we write the human capital earnings equation as:

$$\ln(\text{Wage}_{\text{public}}) = \alpha_0 + \alpha_1 \text{SCHOOL} + \alpha_2 \text{EXP} + \alpha_3 \text{EXP}^2 + \sum_{i=4}^9 \alpha_i \text{OTHER}_i + \varepsilon. \quad (1)$$

Similarly, in the private sector, the human capital earnings equation can be written as:

$$\ln(\text{Wage}_{\text{private}}) = \beta_0 + \beta_1 \text{SCHOOL} + \beta_2 \text{EXP} + \beta_3 \text{EXP}^2 + \sum_{i=4}^9 \beta_i \text{OTHER}_i + v. \quad (2)$$

⁶ Note that all speed money is not illegal. For instance, if you are willing to pay additional money to a municipality's building inspector in North Carolina, you can get it done immediately rather than waiting for the normal 6 weeks. Here the money doesn't go to individuals. The policy implication here is that the government should introduce speed money that goes to the government.

In these equations, the dependent variable is the log of the monthly wage earnings, either actual current wage earnings in the public sector or the expected wage earnings in a comparable job in the private sector. The variables on the right hand side of the equations are the following nine factors: (1) SCHOOL = years of schooling (formal education), (2) EXP = potential job experience⁷, (3) EXP² = the square of potential job experience, and OTHER is a vector of non-economic variables with potential impact on the wages, (4) GENDER = a dummy variable, 1 for female civil servants, (5) EXECUTIVE = a dummy variable, 1 for the public officials working at an executive agency, (6) LEGISLATIVE = a dummy variable, 1 for the public officials working at a legislative agency, (7) JUDICIAL = a dummy variable, 1 for the public officials working at a judicial agency, (8) SATISFACTION = a dummy variable, 1 for the public officials who identify serving the public as a civil servant as the most important reason for joining the public sector, and (9) STATUS = a dummy variable, 1 for the public officials who identify social status of being a public official, working for the government, as the most important reason for joining the public sector. Finally, ε = a well-behaving, i.e. normally distributed, uncorrelated with each other, error term with zero mean and constant variance for the public sector; and v = a well-behaving, i.e. normally distributed, uncorrelated with each other, error term with zero mean and constant variance for the private sector.

Here is the detailed description of wages, schooling, and potential job experience: monthly wage rate in the public sector = [base salary (excluding allowances) + regular allowances and other such payments, e.g. insurance, retirement, vacation, etc. + work related expenses] per month; expected monthly wage rate in the private sector = minimum net salary for accepting a job in the private sector (imagine that an identical job was offered tomorrow) per month; schooling = number of years required to earn the degree that the public official is holding; and potential job experience = age – schooling – 6.

In these equations, the rates of return to schooling are β_1 and α_1 , and they are expected to be positive.⁸ The human capital theory suggests that wages are concave to job-experience, thus β_2 and α_2 should be positive and β_3 and α_3 should be negative. β_4 and α_4 are crude proxies for wage discrimination by gender and are expected to be negative. In moving to the private sector, the civil servant would need to adapt to a new environment and learn the ropes of the new organization. We don't have a priori strong expectations about the directions of agency specific effects, yet we expect that these would vary with the civil servant's type of organization of current work, e.g. executive, legislative, judicial, or local government⁹. Finally, we expect to see no significant difference in the public sector wages of those who attach a value for serving the public and the social status to working for the government and the others.

⁷ Instead of actual job experience, potential job experience is used as a proxy, as a solution to a potential endogeneity problem. For examples, see O'Neil and Polachek (1993) and Schafgans (2000).

⁸ For private sector, all of the rates of return are "expected rates of return" because the private sector wages are not actual but willing-to-accept wages.

⁹ We were also interested in capturing the effects of the location of the workplace. Yet, all of the executive, judicial, and legislative agencies were located in the capital city. In other words, a potential capital city dummy and agency dummies were perfectly correlated with each other. Therefore, capital city dummy is excluded from the regression analysis.

Yet, we expect to see positive effects of these valuations on the willing-to-accept wages for a comparable job in the private sector.

2.2 Decomposing the wage differentials

Equations 1 and 2 are used to find civil servants' wage differentials between the private and public sector. These wage differentials are decomposed in the following equation:

$$\ln \bar{W}_{\text{private}} - \ln \bar{W}_{\text{public}} = (\beta_0 - \alpha_0) + \sum_{i=1}^9 (\beta_i - \alpha_i) \bar{X}_i, \quad (3)$$

where \bar{W}_{private} and \bar{W}_{public} denote the average wage in private and public sectors, and \bar{X}_i is a vector of the average values for nine explanatory variables in equations 1 and 2. The left hand side of this equation represents the difference between expected average private sector wage and the current average public sector wage, and it is comprised of two main components: U and C , where $C = \sum_{i=1}^9 (\beta_i - \alpha_i) \bar{X}_i$, the portion of the difference that can be explained by the differences in the valuation of civil servants' characteristics, i.e., schooling, job experience, gender, and type of agency; and $U = (\beta_0 - \alpha_0)$, the portion that cannot be explained by the differences in valuation of civil servants' characteristics¹⁰. In other words, U can be seen as an estimate of how much officials are making from public sector corruption which they would need to compensate for if they took private sector jobs.¹¹ Obviously, U represents an upper bound estimate due to possible other factors that this model did not take into account.

3 An estimation: quantifying corruption in Albania

As an example, in the first step, the human capital earnings equations for the public and private sectors (Eqs. 1 and 2) are estimated using the data from the Albanian officials' survey. In the next step, the estimated coefficients and Albanian officials' characteristics are utilized in equation 3 to decompose the differential, where the unexplained part of the wage differential is the Albanian officials' implicit valuation of their corruption earnings.

Albania is one of the countries consistently ranked at the bottom of the Transparency International corruption perception index (CPI). For instance, in 1999,

¹⁰ For details, see Blinder (1973), Cotton (1988), and Meng (1998).

¹¹ A civil servant's human capital endowment is the same whether she works for the private or public sector, therefore the first component of a conventional Oaxaca–Blinder decomposition—the effects of endowment differences between private and public sector workers, i.e. estimated coefficient in public sector times the difference between private sector and public sector endowment—does not show up in the right hand side of the equation 3 (for details of the Oaxaca–Blinder decomposition, see Blinder (1973) and Oaxaca (1973)).

Table 1 The employment characteristics of public officials in different agencies

Branch of civil service	Age	Schooling (years)	Job experience (years)	Female (%)	Employed in capital city (%)	Ln ($W_{current}$)	Ln ($W_{expected}$)
Executive	42	16	20	34	72	4.55	5.66
Legislative	41	16	18	77	92	4.44	5.60
Judicial	37	16	14	62	100	4.83	5.99
Local government	43	16	20	31	16	4.23	5.44
All of the branches	42	16	20	36	61	4.48	5.63

Ln ($W_{current}$) log of current wage; Ln ($W_{expected}$) log of expected wage

Albania ranked as number 84 with a score of 2.5 (out of 99 countries, Denmark was number 1 with a score of 10.0, and Cameroon was the number 99 with a score of 1.5); in 2002, it ranked as 81 with a score of 2.5 (out of 102 countries, Finland was number 1 with a score of 9.7 and Bangladesh was number 102 with a score of 1.2)¹². In 2006, Albania's score was 2.6, again, one of the worst countries in terms of its CPI. Indeed, policy makers and civil society organizations in Albania, as well as officials from international financial institutions recognize corruption as a serious problem. There are a number of initiatives to reform public sector administration and programs against corruption such as, the Governmental Commission of the Fight Against Corruption which was established in 1999 (UN 2004).

In 1999 and 2000, as part of a public sector reform program, civil servants' data were collected through a survey of public officials, which was conducted for the World Bank in Albania. The Institute for Contemporary Studies and the Albanian Center for Economic Research administered the survey. This survey asked civil servants their age, gender, place of employment, formal education, current wages, reasons for joining the public sector, and wages necessary to persuade them to leave the public sector and take a private sector job¹³. Table 1 summarizes average age, schooling, job experience, gender, place of employment, current salary, and expected private sector salary of civil servants in the survey sample organized by branch of civil service. As Table 1 shows, the average civil servant was 42-years-old, and had 16 years of schooling. Females constituted about one-third of officials in the sample (more in legislative and judicial organizations), and nearly two-thirds were employed in the capital city. Civil servants' salaries varied widely among organizations: those employed in judicial organizations enjoyed higher salaries and those in local governments were paid less than officials in the executive and legislative branches. Civil servants reported that they would be willing to move to a comparable job in the private sector if paid 251% of their current salaries.

¹² Transparency International's CPI takes values between 0 and 10; and higher the CPI, lower the perceived corruption in a country.

¹³ For the details, see <http://www1.worldbank.org/publicsector/civilservice/countries/albania/index.htm>

Table 2 Estimation results of the wage equations for the public and private sectors as a seemingly unrelated equation system (SURE) by the GLS

Explanatory variable	Dependent variable = log (actual monthly wage in public sector)			Dependent variable = log (willing-to-accept monthly wage in an identical private sector job)		
	Coefficient	Standard error	t-ratio	Coefficient	Standard error	t-ratio
Constant	2.863	0.52	5.47	4.491	0.53	8.41
SCHOOL	0.082	0.03	2.67	0.056	0.03	1.80
EXP	0.018	0.01	1.47	0.015	0.01	1.20
EXP ²	0.000	0.00	-1.61	0.000	0.00	-1.43
FEMALE	-0.175	0.07	-2.70	-0.108	0.07	-1.62
EXECUTIVE	0.283	0.06	4.50	0.177	0.06	2.76
LEGISLATIVE	0.242	0.14	1.75	0.161	0.14	1.15
JUDICIAL	0.600	0.14	4.41	0.524	0.14	3.78
SATISFACTION	0.049	0.08	0.60	0.161	0.08	1.95
STATUS	0.231	0.12	1.92	0.305	0.12	2.48
No. of observations	256			256		
Adjusted-R ²	0.140			0.093		
χ^2	47.780			34.150		

3.1 Estimating human capital earnings equations for Albania

The generalized least squares estimation results of the wage equations for the public and private sectors are presented in Table 2¹⁴. Estimation results show that in the public sector, (1) the rate of return for schooling is 8.2% for each year of formal education, (2) with 18.5 years of job experience, wages are maximized ($EXP_{\text{optimum}} = -\alpha_2/2\alpha_3$), (3) female public officials earn 17.5% less than their male colleagues, and (4) civil servants working in executive agencies earn 28.3% more than civil servants employed in local government agencies. Similarly, civil servants working in legislative and judicial agencies earn more than those in local agencies by 24.2 and 60%, respectively.

Estimation results indicate that for the private sector, (1) the expected rate of return for schooling is 5.6% for each year of formal education, (2) wages are expected to be maximized at 16.9 years of job experience, ($EXP_{\text{optimum}} = -\beta_2/2\beta_3$), (3) female public officials expected to earn 10.8% less than their male colleagues, and civil servants working in executive, legislative, and judicial agencies are willing-to-accept 17.7, 16.1, and 52.4%, respectively, more than those working in local government agencies.

It is interesting to note that there are differences in the willing-to-accept private sector wages based on public officials' personal characteristics. For instance, officials who get personal satisfaction at work from serving public are willing to

¹⁴ To capture potential correlation between the error terms of each wage equation, we model two wage equations as a seemingly unrelated equations system (SURE), and utilize a generalized least squares (GLS) approach in estimation.

accept 16.1% higher, and public officials who joined the public administration for the social status and prestige are willing to accept 30.5% higher to take a comparable job in private sector.

3.2 Decomposing the wage differentials in Albania

We calculate wage differentials by using the estimated coefficients (from equations 1 and 2) in equation 3. The 251.4% expected wage increase by civil servants in moving from the public sector to the private sector was comprised of – 5.9% that can be explained by the differences in valuation of public officials' characteristics (C), and a whopping 257.3% that cannot be explained by the differences in valuation of public officials' characteristics (U). Accordingly, U , the public officials' estimate of their own earnings from corruption is on average 257.3% of their current salary. Thus, by systematically excluding all factors, which contributed to the estimated wage differential, i.e. schooling, experience, gender, job place, officials' non-monetary benefits, and satisfaction from working in the public sector, we derive the residual, which is the Albanian officials' implicit valuation of their corruption income.

What does this 257.3% of current salaries mean? What does it tell us about the size of corruption in Albania? According to the World Bank (2006), total wage bill in Albania was about 6.5% of GDP (or 5.4% of GNP) in 1999. Accordingly, the estimated 257.3% corresponds to a 16.7% of GDP (or 14% of the GNP). Krueger (1974) reports the rent from import licenses in Turkey in 1968 as about 15% of GNP.¹⁵ There are no corruption indicators for 1964 or 1965. Yet, according to Transparency International's CPI, in 1999 Turkey's corruption score was 3.5 (and ranked as number 54) and Albania's score was 2.5 (and ranked as number 84 out of 99 countries rated). Thus, perhaps the number we derived, 14% of GNP in Albania, as the size of administrative corruption is a reasonable number.

4 Concluding remarks

In the previous section, we derived an estimate of corruption in Albania's public sector, based on public officials' actual salaries in the public sector and their willing-to-accept salaries in the private sector. This study was the first attempt to quantify administration on the micro-level anywhere in the world by looking at public officials' salaries. To judge the robustness of this paper's findings, further studies are necessary to look into the estimates of governance in Albania and conduct analyses based on both public and private sector data. Also, cross-country studies might be undertaken to compare and contrast these findings with other findings from transitioning economies or developing countries.

¹⁵ There are no corruption indicators for 1964 or 1965. Yet, according to the Transparency International's CPI, in 1999 Turkey's corruption score was 3.5 (and ranked as number 54) and Albania's score was 2.5 (and ranked as number 84 out of 99 countries rated).

After accounting for factors which impact wages such as schooling, experience, gender, agency type, personal characteristics, and public sector features, we conclude that corruption composes a large amount of a public official's income: we estimated that the amount is 257.3% of a public official's salary. Such a figure implies a significant impact of corruption on the growth of the public sector over the private sector, which is particularly significant for economies in the midst of transition. With corruption composing an enormous amount of a public official's salary, it is no wonder that in some corrupt countries one finds a bloated public administration with a weak private sector. Private sector wages cannot compete against such a high amount of corruption income in the public sector. Without appropriate incentives in the private sector, few people will aim to enter that sector and few people will educate and prepare themselves for the sector. With these characteristics, there are few enticements for FDI or capital inflows; this will further retard the progress of privatization, and the path to economic growth.

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