Contemporary Forms of Slavery: An Empirical Analysis

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Abstract

This paper attempts an empirical analysis on contemporary forms of slavery, using the latest available data and information. In particular, a cross-section of more than 140 countries is examined, to determine which are the main factors driving the differences in the relevance of slavery. An ordered logit model is used to estimate these effects. Preliminary results are discussed and they suggest that support is found for the theoretical hypotheses put forward by historians.

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Contemporary Forms of Slavery: An Empirical Analysis

Introduction

Slavery is still present in the world today. It is believed that around 30 million people in the world live under conditions of slavery or similar to slavery. There is a growing interest in the study of these contemporary forms of slavery, its causes and consequences. Traditionally, most of the research published on slavery is of a historical nature. After the abolition of what is known as the 'Triangle Slave Trade' and its vestiges at the end of the nineteenth century, slavery transformed and adapted to the new economic modus operands, turning into an illegal activity. This is one of the main explanations behind the difficulties researchers face when trying to analyse present-day slavery. Theoretically, many hypotheses have been put forward as factors driving the existence of these forms of exploitative labour. However, there has been little work on testing empirically the plausibility of these theoretical hypotheses. The main obstacle to such studies lies in assembling the necessary data. Data collection is more than a challenge given the illegal and underground nature of contemporary slavery. It is difficult to attain the precise number of people under slavery in the world today. Therefore, it is extremely difficult to carry a comprehensive empirical analysis of a cross-section of countries in order to find out what slavery is driven by. Nonetheless, it is now possible to make such an attempt. This study uses the latest available data on slavery in the world today in order to test empirically the theoretical ideas, which have not been explicitly outlined.

Review of the Literature

Since the late 1990s, a growing number of research studies have addressed the problem of contemporary slavery in its various forms. This renewed interest in slavery was assisted by the onset of globalisation[2] and the subsequent greater migration flows across the world. Of all contemporary forms of slavery, the traffic in human beings, for a wide range of purposes, is undoubtedly the one which has caught most of researchers' attention. Alas, it is by no means, the only form of slavery present in the world today. The most controversial issue when approaching the study of slavery is its definition. During the twentieth century, slavery came to encompass an ever-wider range of exploitative labour relations. Although theoretical delimitations were once and again defined, the practice of slavery and its forms is usually more volatile than any theoretical understandings. Avoiding engagement in the theoretical debate on what slavery is, it is however necessary to establish what particular practices I will be considering under the

[2] A comprehensive definition of globalisation is provided by Professor Lubbers: Globalisation is 'the phenomenon [in which] the degree of global human interaction increases to such an extent that both, its primary effects and the reactions it provokes, give rise to numerous new developments. Globalisation is caused by three prime movers: technological globalisation, political globalisation and economic globalisation. The three prime movers initiated a process in which geographic distance becomes less a factor in the establishment and sustenance of border crossing, long distance economic, political and socio-cultural relations and which we call globalisation. People become aware of this fact. Networks of relations and dependencies therefore become potentially border crossing and worldwide' (in http://globalize.kub.nl/).

heading of 'contemporary forms of slavery'. The definition includes practices such as 'white slavery', forced labour, debt bondage, child prostitution, forced prostitution and sexual slavery, excluding other practices as forced marriages and prison slavery. The operational definition followed here was proposed by Bales (2002:4). Slavery is, therefore, 'an economic and social relationship marked by the loss of free will, where the person is forced by the use of violence or its threat to give up his/her ability to sell freely his/her own labour'.

As mentioned previously, a growing number of studies have attempted to empirically determine which are the causes and consequences of slavery, in its contemporary forms. Given the aforementioned difficulties with data collection, and the reluctance of governments to admit that slavery is still present in their domains, researchers have tried to overcome these difficulties by concentrating on a reduced geographical area, and usually focus on one concrete manifestation or form of slavery. Surveying a sample of people is often the methodology employed in such studies. Researchers typically engage in a descriptive analysis of the data, with few attempting more sophisticated modelling. This, of course, depends entirely on the data available, and frequently the size of the sample or its composition does not allow for more.

This section does not attempt to present an exhaustive overview of the growing literature, but rather concentrates on a selected handful of them which represent the methodologies generally applied in this research area.

Kielland and Ouensavi (2001) examined the results of a study on child labour migration in Benin. The advantage of their study is they had access to enough resources to carry a large-scale rural household survey[3] in the year 2000. This allowed them to analyse the individual and household level decision-making which resulted in the trafficking of children. They analysed the reasons behind child labour migration[4] from Benin, to adjacent countries or to urban and more prosperous areas within Benin.

Even though their study is region-specific and it only looks into trafficking, it is useful since their methodology is similar to the one followed in this paper. They used a logistic regression, where the dependent variable is defined as the likelihood of a rural child aged 6-16 to be sent away to work to test the following hypotheses:

[3] The sample was representative of the population. It collected information from six regions in the country (Atacora, Atlantique, Borgou, Mono, Oueme and Zou). 3,000 mothers were interviewed, approximately 500 from each region. They ended up with a sample of 19,165 children aged 0-18, after visiting 4,726 households and interviewing 4,728 mothers. Their study centres on the 11,606 children aged 6-16.

[4] They refer to both, child trafficking (across national borders) and child migration within the country.

Whether child labour migration is caused by:

Causes	Explanations favoured by
Poverty	Economists
Boredom	Anthropologists
Lack of information	NGOs

Their findings favour the economists view. Poverty at village levels and lack of opportunities are important in explaining trafficking, supporting theoretical conjectures on modern slavery. The authors control for factors to curb child labour migration, for instance the encouragement of local markets and public places within the villages, colleges and apprenticeships, access to credit for women, campaigns alerting parents on risks and dangers of child labour migration and raising awareness on children's developmental needs and their relative vulnerability.

Kundu, Reddy and Sharma (undated), as the previous study, also followed a micro approach. They based their report on data extracted from base-line surveys, funded by the International Labour Organisation (ILO), which conducted the surveys in Nepal, India and Bangladesh. The focus is on debt bondage and in two regional areas of India and Nepal only, as the data on Bangladesh was not yet available at the time of their study. They calculated a vulnerability to debt bondage index (VDBI) using Principal Component Analysis[5]. Their study is relevant because it lists a range of factors which the authors consider key in making a particular individual vulnerable to falling into debt bondage. These factors are grouped into four different indexes: *Characteristics of Debt Bondage or Bondedness, Trigger Factors, Socio-Economic Indicators* and *Protective or Preventive Factors.*

In addition, the authors emphasised the importance of region-specific contextual and environmental factors in determining the incidence of bonded labour, but because such indicators were to be taken from secondary and aggregate sources, they were all excluded. Some of the factors they considered are included here as explanatory variables.

In Bales (2000), unlike in the two previous studies, the sample units are individual countries. Bales estimated a regression model to explain which factors were more important in determining the trafficking to and trafficking from a specified number of countries. In the model explaining human trafficking from a country, for example, the included measures were: the population profile of the country of origin, poverty, population pressure, lack of opportunity, governmental corruption, conflict and social unrest. It establishes preliminary evidence as a foundation on which to base the present study, as it presents a cross-section to test for trafficking across countries.

[5] Principal Component Analysis is a descriptive technique applied to multivariate analysis. It aims to describe the multivariate structure of the data by reducing the dimensionality of a data set while retaining as much as possible the variation present in the data set.

Smith (2002), using data for various countries, furthers the literature by establishing a link between the presence of contemporary slavery, on the one hand, and the development status of the country, on the other. He examined how properties of a particular country predict a country's rank on the United Nations Human Development Index[6], using as covariates:

- A country's cultural type
- Presence of contemporary slavery
- Political freedom
- Corruption
- Conflict and Social Unrest
- National debt

Smith (2002) concluded that the contemporary slavery and the political freedom variables were the best explanations of the region-to-region variability in the 'hdi' rank, and social conflict and corruption were important in explaining the variation among countries within regions. His analysis is relevant because he includes the categorical variable 'slavery' as an explanatory variable in his model, and this same variable I will be using in the analysis that follows, only this time it will be the dependent variable. His study is important as it also analyses a cross-section of countries.

Table 1 in Appendix 1 contains a summary of each of these studies, their focus and their relevance towards this present study.

Data Definitions[7]

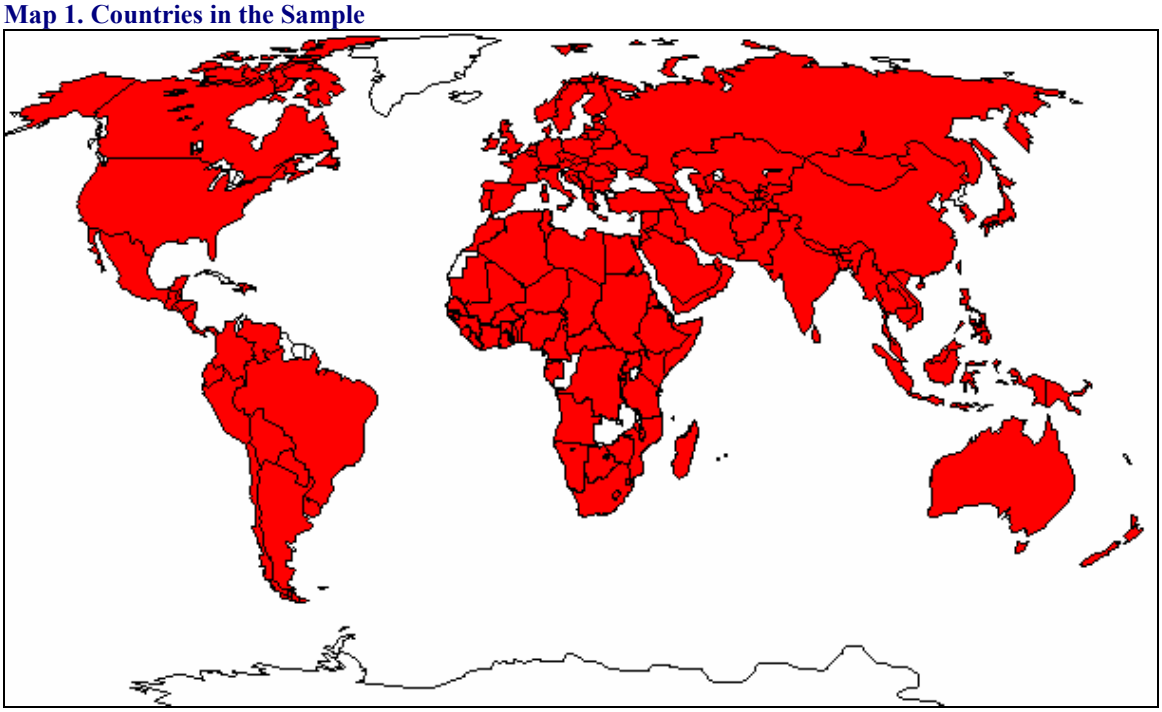
The initial sample considered consists of a cross-section of 158 countries. The selection of these countries mainly depended on the data available for the dependent variable, 'slavery'. The map below shows the countries included in the sample.

The following section presents the definitions of the most relevant variables considered in the estimation section. For more definitions, please see Appendix 2.

[6] The Human Development Index (HDI) is a summary measure of human development, which focuses on the ends, rather than the means of 'development' and progress. It combines indicators of life expectancy, educational attainment and income (HDR 2002).

[7] Appendix 2 shows more definitions of other variables which are also considered in the estimations. Not all results are shown. Only those more significant or of particular interest are included. When variables do not appear, this is because they were very insignificant, and their effects were captured by the variables present in the model.

Map 1. Countries in the Sample



The variable 'slavery' is a five-category ordinal classification of countries according to the prevalence of the forms of slavery given by Bales (1999). This variable, as he explains, is 'an ordinal construct of three or four variables'. He collected a vast amount of information on each country, and then presented the data to a number of 'experts' in the field. Comparison between the information collected and the knowledge of these experts, plus the developed working definition stated above, gave an estimated number of slaves for each country. These estimates were later grouped, by assigning a categorical point on an ordinal scale of slavery to each country. The indicative numbers are:

0: no slavery,
1: very little/occasional slavery,
2: persistent small amounts of slavery,
3: slavery is regular in some economic sectors,
4: slavery is regular in several economic sectors

The 'hdi' variable indicates the Human Development Index for 1995 or 1975 for a given country. The series are taken from the United Nations Development Program (UNDP). It is a composite index measuring average achievement in three basic dimensions of human development-a long and healthy life, knowledge and a decent standard of living. The index combines in one score a country's level of literacy, income per capita, and longevity. It measures the average achievements in a country in three basic dimensions of human development:

- A long and healthy life, as measured by the life expectancy at birth.
- Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary, and tertiary gross enrolment ratio (with one-third weight).
- A decent standard of living, as measured by GDP per capita."

Its values range from 0 to 1. The higher the score, the more develop the country is.

The variable 'pop' indicates a country's total population for the year indicated. It is taken from the World Development Indicators database. Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin.

The variable 'Gdpppp' represent the GDP per capita in PPP (purchasing power parity) or current international dollars for 1975 or 1995 respectively, for each of the countries in the sample. PPP GDP is converted to international dollars using purchasing power parity rates, so that an international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States, making cross-country comparison and analysis more palatable. The series are taken from WDI, various years.

The variable 'childlf' indicates the share of children in the age group 10-14 active in the labour force. Labour force comprises all people who meet the International Labour Organization's definition of the economically active population. It is taken from WDI database.

The variable 'lf' indicates total labour force, which comprises people who meet the International Labour Organization definition of the economically active population: all people who supply labour for the production of goods and services during a specified period. It includes both the employed and the unemployed. While national practices vary in the treatment of such groups as the armed forces and seasonal or part-time workers, in general the labour force includes the armed forces, the unemployed and first-time job seekers, but excludes homemakers and other unpaid caregivers and workers in the informal sector. The source is the WDI database.
The variable 'lfgr' is defined in a similar way to 'popgr'. It simply represents the average annual growth of the total labour force from 1961 to 1995. The source is the WDI database.

'Corruption' is a categorical variable referring to the level of corruption within each country. Its original series comes from the corruption perception index (CPI) circa 1998 from Transparency International; Kevin Bales filled in some missing values. The index scores range from 1 (Most Corrupt, assigned to Iraq and Myanmar) to 10 (Least Corrupt, assigned to Denmark).

'dsevere' is a dummy variables from the World Bank which gives the value of 1 if a country is severely indebted. It is provided by the World Bank as a Fixed Effect in their 'Social Indicators' database.

The indicator 'polright' compiled by Bales (1995, 1999) enumerates the state of political rights in each country, It ranges from 1, where political rights are granted and respected to 7, where there is no respect.

The regional dummy variables are eap, eca mena, sa we, na, ssa and lac, all taking the value of 1 for each country in the corresponding region and 0 otherwise. The values are taken from the 'Social Indicators and Fixed Factors' Data base available at the Growth Web Page from the World Bank. More specifically:

eap: East Asia and Pacific
eca: East Europe and central Asia
mena: Middle East and North Africa
sa: South Asia
we: West Europe
na: North America
ssa: Sub-Saharan Africa
lac: Latin America and Caribbean

The dummy variables indicating the cultural type are taken from Smith (2002), who resorted to the data originally used by Huntington (1996, 26-27). As he explains in his paper:

> 'Samuel Huntington ([1996], 1997, 26-27) present[ed] a map of the world that characterize[d] the dominant culture of each country as Western, Latin American, African, Islamic, Sinic, Hindu, Orthodox, Buddhist, or Japanese. By carefully inspecting his map and also distributions of religious affiliations, each country was provisionally classified according to its dominant cultural type as defined by Huntington.' (Smith, 2002:7-8)

Nonetheless, Smith is aware of the critics and caveats with such a measure. He notes comments by Nobel Prize Laureate Amartya Sen (2002, 30-33), who disagrees with Huntington's classification given many countries do not have unitary cultures. In the case of India, for example, Sen highlights that even when the country is classified as Hindu, there are still 125 million Muslims living there. The truth of the matter is, as Smith himself acknowledges, 'people have complex group affiliations and not just one salient identity; and partitioning people on the basis of their civilization or culture may contribute to conflicts in the world' (Smith, 2002:8). However, Smith goes on to use such classification as it has been somehow supported by some others, such as the work developed by Johan Galtung (1992), who came to a similar classification of countries based on geopolitics, completely independent from that of Huntington's (Smith, 2002:8). Smith also found cultural types are associated with differences in a country's 'hdi' rank. This is the main reason of the inclusion of these dummy variables in the current paper. The original cultural types are 'African', 'Buddhist', 'Hindu', 'Islam', 'Japan', 'Latin', 'Orthodox', 'Sinic' and 'Western'. Nevertheless, in the estimations presented below, the variables for Buddhist and Hindu religious type were combined into one, namely,

'Budhindu'. Similarly, the variables referring to the types 'Japan' and 'Sinic' were combined into one, 'Eas' (East Asian cultural type). This was done for degrees of freedom considerations.

The variables 'traffickingto' and 'traffickingfrom' are both categorical variables which indicate the persistence of trafficking to or from a particular country. It is taken from Bales (1999). It takes five different categories:

0: no trafficking
1: rare cases of trafficking
2: occasional, but persistent cases of trafficking
3: regular cases of trafficking in small numbers
4: regular cases of trafficking in large numbers.

Descriptive Statistics

In the graphs and tables presented in this section, the main characteristics of the sample under study are shown.

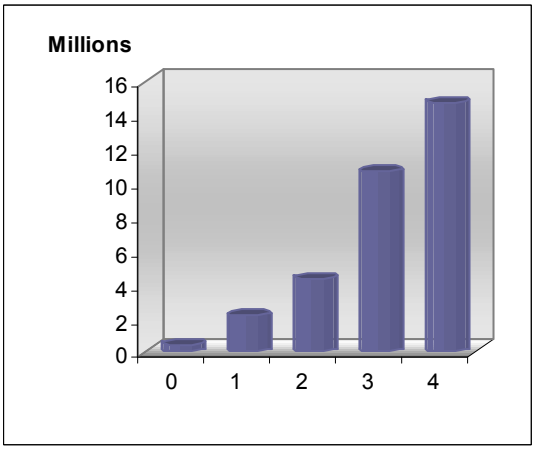
The first graph shows a positive relationship between the presence of slavery in a given country and the mean of the total population for each of the slavery categories. The greater the population of a country is, the greater the supply of potential people who may be enslaved. The more populated countries not only have higher population growth rates, but also higher fertility rates, i.e. more births per women. Countries with a slavery score of 4 have an average population growth of 2.34 and an average of 4.25 births per women[8]. The corresponding figures for the countries with a slavery score of 3 are 3.06 and 4.78, in comparison to the 0.9 and 2 average values of those countries with no slavery. Moreover, as the number of people increases, following the laws of supply and demand, the 'prices' of these potential slaves plummet.

In the second graph, the GDP per capita, taken as an indicator of development in a country, appears to be negatively related to slavery. Taking the means for each of the categorical groups represented in the variable 'slavery', it seems clear that in poorer countries, with lower GDP per capita, the possibilities of accepting any form of labour, even if it implies being enslaved, are much greater.

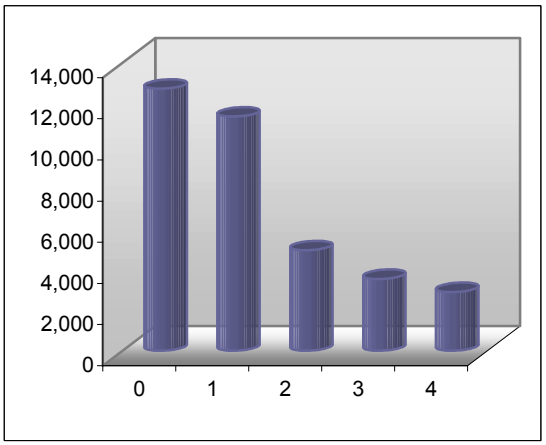
The third graph mainly confirms the relationships indicated by the previous two graphs. It shows the relationship between the categorical variable 'slavery' and the mean score for each group on the Human Development Index. Again, it is negative. That is, the higher the score in the Human Development Index, the more developed the country is, and the less likelihood of slavery being present in the country. This is consistent with theoretical expectations, in which a stringent economic situation in a country determines the degree of precarious labour conditions.

[8] These figures are for the year 2002, taken from the World Development Indicators data base online http://devdata.worldbank.org/data-query/

Graph 1. Average Population vs. Slavery.

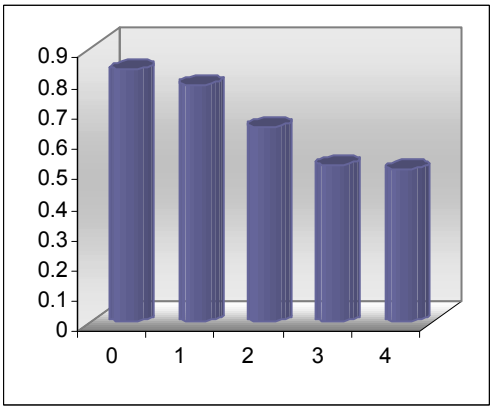


Graph 2. Average GDP PPP vs. Slavery



In Table 2 in Appendix 1, we present some more data by categorical slavery groups. The table gives us the values and names of countries with the minimum and maximum values by category for each of the variables in the first column. The percentage of children dying before the age of 5 seems to be considerably greater for the two groups in which slavery is a regular feature in their economies. Another interesting feature is given by the variable that represents the share of children age 10-14 active in the labour force. Countries with the highest shares of children in the labour force are also the most likely to experience slavery regularly. Although when comparing minimums, there seems not to be any difference among groups, there is. The number of countries with no child labour force, that is, with a value of 0, diminishes as slavery goes from 0 to 4.

Graph 3. HDI vs. Slavery



For comparison purposes, it is important to know the number of countries per category. These are indicated in the Table (a) below:

Table (a). Number of Countries by Slavery Categories

Category	Number of Countries	Percentage in each category
0	9	5.7
1	55	34.8
2	55	34.8
3	22	13.9
4	17	10.8

Table 3 in Appendix 1 presents the means for each of the variables on the first column by slavery category. Usually those countries with higher slavery scores perform worse, having, for example, higher child mortality rates, higher levels of unemployment, higher levels of corruption and human rights abuses, lower rates of enrolment in primary and secondary school education, etc. The Social Security Variable in the last row in Table 3 indicates the number of countries under each slavery category in which a Social Security Scheme is available, against the number of countries in each slavery category for which data on this variable was available. Therefore, of those 9 countries with no slavery (Table (a) above), data was available for only 8 of them, and of these, only in 6 there was a Social Security Scheme available. Similarly, of the 17 countries with slavery in many of their economic sectors (Table (a) above), there was data available for all 17, but only one country had a Social Security Scheme in place.

Table 4 indicates the number of countries in each of the cultural types and regional dummy variables by slavery categories. For example, of those countries with no slavery, 2 are of Latin cultural background, 1 Orthodox, and 6 Western. Similarly, for this same slavery category, there are 5 in the Western geographical area (We), 1 in the East Asia and the Pacific (Eap), 1 in Latin America and the Caribbean area (Lac) and 2 in the East Europe and Central Asia (Eca). The table shows how the worst performers in terms of slavery are in the Sub-Saharan African area (Ssa).

These graphs and tables point at some of the variables that may be important in explaining the presence of slavery in a particular country. Before presenting any further analysis, the next section provides the rationale for the methodology here chosen, as well as its intricacies.

Methodology

The methodology employed in this research paper is a quantitative approach which aims to determine what are the major factors driving the presence of slavery in a particular country. For this to be possible, a comprehensive dataset was compiled in order to form a cross-section of 158 countries.

It is important to highlight the aims of the paper to avoid any possible confusion or misunderstandings. Using cross-section analysis, we are interested in arriving at generalisations about the dependent variable, in this case, slavery. In this kind of setting, what matters are averages, and what it is hoped to do is to explain the differences in the

likelihood of slavery across countries. Cross-section analysis is quite common in many fields of economics and social sciences, in particular the literature on economic growth. Despite being popular, this does not mean it is free from problems. Detractors of cross-section analysis have long established its main weaknesses.

The classical problems analysts encounter in cross-section research are:

- The presence of outliers[9].
- The problem of heterogeneity.
- The uncertainty about the correct model, with various specifications being equally compatible.
- Measurement error or the deviation of measured values from their true values.
- The endogeneity problem, in which we are uncertain of the direction of causality among variables.

Among them, the one, which causes most concern, is the lack of heterogeneity in a cross-section of countries. Certainly, 'countries differing widely in social, political and institutional characteristics are unlikely to fall on a common surface' (Temple, 1999:126), assumption which is often made when working with a cross-section of countries[10]. Comparisons are not easy, especially when we are considering such a diverse sample, with developed and developing countries alike. Consequently, measurement error may differ widely. Data quality in developing countries is unlikely to match those of their developed counterparts. Reliable data are hard to come by, even more so when the nature of the problem in question takes place in an illegal framework. However, this is not an exclusive problem of the present study. Even the most generally accepted figures, such as the GDP[11] of a country, have been questioned. For instance, for countries with a considerable informal economic sector, output levels may be substantially understated. Another data related problem is the combination of data extracted from different sources. It is often the case that definitions vary from country to country, and the numbers compiled may actually show different things. As Hamermesh (1999:2) stresses, it is important to be sure that our empirical proxies match our theoretical constructs. As he continues, 'we need to ask ourselves whether we have found the best available data for the purposes and, more important, whether those data offer any hope of representing the concept' (Hamermesh, 1999:2). Organisations such as the World Bank and the International Labour Organisation have devoted plenty of resources in overcoming this problem, so that data may be not only representative, but also comparable.

As Temple (1999:119) points out, given the problems stated above, many consider cross-section analysis as fruitless, and advocate for a more historical approach, in which the peculiarities of each country are individually examined. These opponents – he continues

[9] Outlier: An observation that is very different to other observations in a set of data. (*A Dictionary of Statistics*. Graham Upton and Ian Cook. Oxford University Press, 2002. *Oxford Reference Online*).
[10] In a field trip to South Asia, summer 2003, I was reminded of this fact. One particular student, which I thought of as rather reactionary and short-sighted, vehemently insisted on the impossibility of placing his country, India, together with any other in the world, given its peculiarities. He could neither understand my explanations.
[11] GDP: Gross Domestic Product of a country. See Appendix for definition.

– state that the appropriate research questions and policies will depend on a country's particular situation, and historical studies are more likely to be sensitive to these issues[12]. And this may be precisely one of the reasons why slavery has been the subject of research of, most of all, historians. True, historians bring to bear a much deeper conception of the social, political, institutional and technological sources of slavery than any empirical analysis may be able to incorporate in formal statistical models. Temple (1999:119) is correct in saying that what historians do is to point at potentially relevant factors and to generate hypotheses, which are then tested by empiricists. Historical analysis is not the answer, however. Simon Kuztnets, Nobel Prize Laureate in Economics in 1971, recognised the limitations of historical studies: 'the isolated study of just one or two countries provides only a partial view[13] (Kuznets, 1966:32)'. Moreover, historical studies are not immune to the statistical problems of cross-sections, as they have the equivalents of endogeneity and omitted variables. Therefore, both types of analysis are complementary to each other, each contributing in its own way. Cross-section analysis is a useful complement to more traditional approaches and, as Temple (1999) concludes, 'if well done, it can help to identify the relative contributions of different influences more precisely than historical studies'. Bearing all these things in mind, it is now time to explain in more detail the chosen model.

Ordered Logit[14]

The dependent variable is slavery, a categorical variable with 5 different levels. This variable is measured on an ordinal scale, from 0 to 4, which represents crude measurement of an underlying interval and continue scale. The total number of people enslaved in each country is difficult to measure, given slavery is an illegal and underground activity. The categorical variable slavery is therefore a proxy to this unmeasured latent variable. The value for each country on this ordinal scale depends on whether or not each country has crossed a particular threshold. The assignment of a value to each country was carried out by a wide panel of experts, who were consulted and presented with a wide variety of data, and who contemplated only the practices included in Bales's working definition, presented above. We can analytically summarize this as follows:

$$Y_i=0 \quad \text{if} \quad S_i \leq \delta_1$$

$$Y_i=1 \quad \text{if} \quad \delta_1 \leq S_i \leq \delta_2$$

$$Y_i=2 \quad \text{if} \quad \delta_2 \leq S_i \leq \delta_3$$

[12] The paragraph which follows adapts to slavery much of the exposition by Temple (1999) on historical studies of economic growth.
[13] Cited in Temple (1999).
[14] The quantity ln (p/1-p) where p is the probability of success is called the logit. The term 'logit' was introduced by Berkson in 1944. Modelling variations in proportions directly is hampered by the need to ensure that estimated probabilities lie in the interval (0, 1). Since corresponding values for the logit lie in the unrestricted interval $(-\infty, \infty)$, models for proportions are usually constructed in terms of logits.

$Y_i=3$ if $\delta_3 \leq S_i \leq \delta_4$

$Y_i=4$ if $S_i \geq \delta_4$

Where Y is the categorical variable 'slavery', and S_i is the unobserved latent variable, i.e., the total number of slaves in country i. In words, what this is saying is that, countries with an estimated number of slaves of δ_1 or less, a slavery score of 0 will be assigned to them. Similarly, if the country is estimated to have between δ_1 and δ_2 number of slaves, a slavery score of 1 will be assigned to them, and likewise for the rest of the categories. By definition, the δ's must satisfy $\delta_1 < \delta_2 < \delta_3 < \delta_4$. We therefore have four threshold points, the δ's, to be estimated.

Having a dependent variable such as 'slavery' means we cannot use traditional linear regression models to examine it, especially when we do not have enough categories to treat the dependent variable as analogous to a continuous variable. In cases such as this, ordered logit models are usually employed, also known as the proportional odds model. Ordered logit uses maximum likelihood methods[15], and finds the best set of regression coefficients to predict values of the logit-transformed probability that the dependent variable falls into one category rather than another. It fits a set of cut-off points. If there are *r* (5 in our case) levels of the dependent variable (1 to *r*), it will find *r*-1 (4 in our case) cut-off values k_1 to k_{r-1} such that if the fitted value of logit(*p*) is below k_1, the dependent variable is predicted to take value 0, if the fitted value of logit(*p*) is between k_1 and k_2, the dependent variable is predicted to take value 1, and so on. This is best shown analytically.

The structural[16] model in the population is equal to:

$$S_i = \sum_{k=1}^{K} \beta_k X_{ki} + \varepsilon_i \qquad (1)$$

That is, the total number of slaves in a country i, depends on K explanatory or independent variables. The term ε_i is the disturbance term, which takes into account variables that may be left out of the model or measurement errors, *i.e.* it reflects

[15] Maximum Likelihood is a commonly used method for obtaining an estimate of an unknown parameter of an assumed population distribution. The likelihood of a dataset depends upon the parameter(s) of the distribution or probability density function from which the observations have been taken. In cases where one or more of these parameters are unknown, a shrewd choice as an estimate would be the value that maximizes the likelihood. This is the maximum likelihood estimate (mle). Expressions for maximum likelihood estimates are frequently obtained by maximizing the natural logarithm of the likelihood rather than the likelihood itself (the result is the same). Sir Ronald Fisher introduced the method in 1912. (Source: *A Dictionary of Statistics*. Graham Upton and Ian Cook. Oxford University Press, 2002. *Oxford Reference Online*. Oxford University Press).

[16] Structural equations specify, by means of a set of linear equations, how a set of variables are related to each other in terms of cause and effect (causal models) or paths through ordered networks of statistical dependence (path analysis). (Source: *Dictionary of Sociology*. Ed. Gordon Marshall. Oxford University Press, 1998. *Oxford Reference Online*. Oxford University Press).

differences between countries not controlled for. This variable is assumed to be logistically distributed, that is, $F(\varepsilon_i) = \frac{1}{1+e^{-\varepsilon_i}}$.

The ordered logit model estimates only part of the above structural model. We can now express the model in terms of probabilities, namely:

$$P(Y = i|x) = P(\delta_{i-1} < S_i \le \delta_i|x) \quad (2)$$

$$P(y = i|x) = P(\delta_{i-1} < x\beta + \varepsilon \le \delta_i|x) \quad (3)$$

$$P(y = i|x) = P(\varepsilon < \delta_i - x\beta|x) - P(\varepsilon \le \delta_{i-1} - x\beta|x) \quad (4)$$

$$P(y = i|x) = F(\delta_i - x\beta) - F(\delta_{i-1} - x\beta) \quad (5)$$

To understand this a bit better, let us apply this to our particular case. Since we have assumed that the disturbance terms are logistically distributed, we can obtain the following probabilities:

$$P(Y_i = 0) = P(x'_i\,\beta + \varepsilon_i \le \delta_1) = \frac{1}{1+\exp(x'_i\,\beta - \delta_1)} \quad (6)$$

$$P(Y_i = 1) = P(x'_i\,\beta + \varepsilon_i \le \delta_2) - P(x'_i\,\beta + \varepsilon_i \le \delta_1) = \frac{1}{1+\exp(x'_i\,\beta - \delta_2)} - \frac{1}{1+\exp(x'_i\,\beta - \delta_1)} \quad (7)$$

$$P(Y_i = 2) = P(x'_i\,\beta + \varepsilon_i \le \delta_3) - P(x'_i\,\beta + \varepsilon_i \le \delta_2) = \frac{1}{1+\exp(x'_i\,\beta - \delta_3)} - \frac{1}{1+\exp(x'_i\,\beta - \delta_2)} \quad (8)$$

$$P(Y_i = 3) = P(x'_i\,\beta + \varepsilon_i \le \delta_4) - P(x'_i\,\beta + \varepsilon_i \le \delta_3) = \frac{1}{1+\exp(x'_i\,\beta - \delta_4)} - \frac{1}{1+\exp(x'_i\,\beta - \delta_3)} \quad (9)$$

And finally,

$$P(Y_i = 4) = P(\delta_4 \le x'_i\,\beta - \delta_4) = 1 - \frac{1}{1+\exp(x'_i\,\beta - \delta_4)} \quad (10)$$

Now in terms of the odds ratios, we can write:

$$odds(y = k|x) = \frac{P(y \le k|x)}{P(y > k|x)} \quad (11)$$

The logarithmic transformation leaves us:

$$Ln(odss(y = k|x) = \delta_k - x\beta \quad (12)$$

Finally, the log likelihood function for ordered logistic regression is:

$$\sum_{i=1}^{J}\sum_{y=i} \ln[F(\delta_i - x\beta) - F(\delta_{i-1} - x\beta) \quad (13)$$

As can be seen from this last expression, ordered logit is a cumulative probability model.

As mentioned above, the estimation of the unknown coefficients β's and thresholds δ's is done numerically using the method of maximum likelihood, where the above probabilities are the elements of the likelihood functions. From equation (1) above, the probability of presence of slavery in a country increases, if a β_i is positive and the corresponding explanatory variable x_i increases. This can be seen more formally by calculating the derivatives of the cumulative probabilities:

$$\frac{\partial P(Y_i \le k)}{\partial x_i} = -\beta_i \frac{\exp(x'_i \beta - \delta_k)}{(1 + \exp(x'_i \beta - \delta_k))^2} \quad (14)$$

where the $P(Y_i \le k) = \frac{1}{1 + \exp(x'_i \beta - \delta_k)}$. (15)

This tells us that the probability of a country reporting a level of slavery k decreases with an increase in any of the explanatory variables if its corresponding coefficient β_i is positive, and the other way around if $\beta_i \le 0$.

This rather dense exposition of the ordered logit model may be daunting for the non-quantitative researcher, but it all becomes much clearer when presenting the actual results, as it is done in the following section.

Results: Interpretation and Limitations

Table 5 in Appendix 1 shows the results for the estimated ordered logit models. Model (1) includes as explanatory variables the total population of each country in 1995, the GDP per capita in PPP for the respective country in 1995, the score of each country in the Human Development Index for 1995, and indicators of the level of corruption, political rights and trafficking to and from each country. Model (2) is the same as Model (1), apart from including a dummy variable which equals 1 for the highly indebted countries.

Before going any further, and for ease of exposition, I will divide the interpretation of the results obtained in four sections. Section one refers to the overall significance of the model, the second examines the overall significance of all independent variables on the dependent variable, the third looks to individual significance levels of each included variable and the fourth looks at the effect of individual explanatory variables on the dependent variable, keeping the other variables constant.

Overall Significance

In linear regression, the value of the R^2 statistic or coefficient of determination tells us how well our model fits the data. Generally, the closer the value is to 1, the better the model is. With maximum likelihood estimation, there is no such statistic. However, many authors have suggested measures for goodness of fit. One such measure was proposed by McFadden and it is known as Pseudo-R^2. The value of this Pseudo-R^2 in Model (2) is 0.335, which is slightly higher than the value in Model (1). This likelihood ratio index has, following Greene (2000), an intuitive appeal in that it is bounded by zero and one. If all the slope coefficients are zero, then it equals zero. There is no way to make the ratio equal one, although one can come close. It has been suggested that this finding is indicative of a 'perfect fit' and that the ratio increases as the fit of the model improves. Unfortunately, the values between zero and one have no natural interpretation (Greene, 2000:683). So this value is not as indicative as an R^2 would be in OLS regressions.

Overall significance of included explanatory variables

Next, we investigate whether the overall relationship between all the independent variables and the dependent variable is significant. This is equivalent to carrying an F-test in Linear Regression. In Logistic Regressions, this is addressed using the log-likelihood ratios for the model. Table 5 shows the value of the log-likelihood ratio for the null model, in which the coefficients for all regressors or explanatory variables are taken as zero. This is the Log-Likelihood (0) in our maximum likelihood iterative estimation method. It also shows the log-likelihood for the fitted model. The difference between these two Log-likelihood ratios, multiplied by two, is distributed as a χ^2 with degrees of freedom equal to the number of included variables (n), and so can be used to test the overall significance of the model. In model (1) this value is 131.21 and for model (2) is 139.0. These values tell us that we can reject the null hypotheses that all the included explanatory variables are zero, against the alternative which establishes that, at least one of them is significantly different from zero.

Individual significance of included explanatory variables

Testing the individual significance of an individual variable, keeping all the other variables constant, is similar to carrying a t-test in Linear Regression. Numbers in parentheses in our Table 5 show the square of the estimated coefficients divided by its standard error. Numbers in italics indicate the p-values of these statistics. For significance, we seek for a p-value less or equal to .05 or 0.1 the most, which correspond to a 5% and 10% significance value. In Model (2), the population variable, the Human

Development Index, the GDP per capita and Political Rights are all significant at the 10% level. The rest of the variables are significant at the 5 % level of significance.

Effects of individual explanatory variables.

This is the most relevant of all sections, as it interprets the numbers obtained in terms of theoretical expectations. The results may be difficult to interpret at first, given that the ordered logit is really a multiequation model and Table 5 shows them as a single equation model. Careful examination will avoid any misleading conclusions or misinterpretations.

As a starting point, we will look at the coefficients from Table 5. The signs of the estimated coefficients are only directly informative for the probabilities associated with those countries with no slavery (first category) and those with regular presence of slavery in many economic sectors (last category). A negative coefficient implies that, ceteris paribus[17], the probability of a country not suffering from slavery increases if there is an increase in the corresponding explanatory variable. Consequently, from Model (2), we can say that, given the negative coefficient associated with the Human Development Index, the probability of a country having no slavery increases the more developed this country is, or the higher its score on the Human Development Index ('hdi'). We know that the 'hdi' is a composite index measuring the average achievements in a country in terms of life expectancy at birth, literacy rate and enrolment rates in primary, secondary and tertiary education, and the GDP per capita. What this estimate is telling us, therefore, is that, the probability of any one country of having no slavery increases the higher its life expectancy, the more people are literate and enrol in formal education, and the higher its GDP per capita. Consequently, this result suggests that, for a country to prevent slavery from being present, improvements on its economic development seem to be a guaranteed winning strategy. Likewise, the negative coefficient in the Corruption variable tells us that the probability of a country being slave-free increases as its value on the corruption indicator increases, which corresponds to a lower corruption level[18] in the particular country. Similarly, the negative sign on the coefficient of GDP per capita, informs us that the probability of a given country having no slaves increases as its GDP per capita increases. All these results confirm what one might have expected theoretically. Looking at the coefficients of the rest of the variables included in Model (1) and (2), we can say that all variables have the a priori expected signs. The positive sign on the population coefficient indicates that, the most populated the country, other things being equal, the greater the probability of slavery present in many of the economic sectors of the country, which is in agreement with pre-estimation expectations. The negative coefficient on the GDP per capita in both models (1) and (2) of Table 5 in Appendix 1 show that, ceteris paribus, the higher the level of GDP per capita in a given country, the higher the probability of no slavery. The positive sign associated to the variable indicating the state of political rights in each country reveals that, the higher the score in this variable, the higher the probability of finding severe slavery in the country, other things being equal. A higher score in the 'polright' variable is associated with a worse situation in the country in terms of respect of political rights of its citizens. The positive signs in the trafficking to

[17] 'Other things being equal'.
[18] Please, see description of variables for more information.

and trafficking from variables indicate that, the higher a country's score, the higher the probability of severe slavery in the country, other things being equal. Finally, the positive sign in the variable which indicates whether a country is severely indebted or not could be interpreted the following way. Given any two countries which were similar in respect of every characteristic except indebtedness, the country which was severely indebted was more likely to experience slavery in many of its economic sectors and less likely to have no slavery at all than a country which was not severely indebted (Borooah, 2002:24).

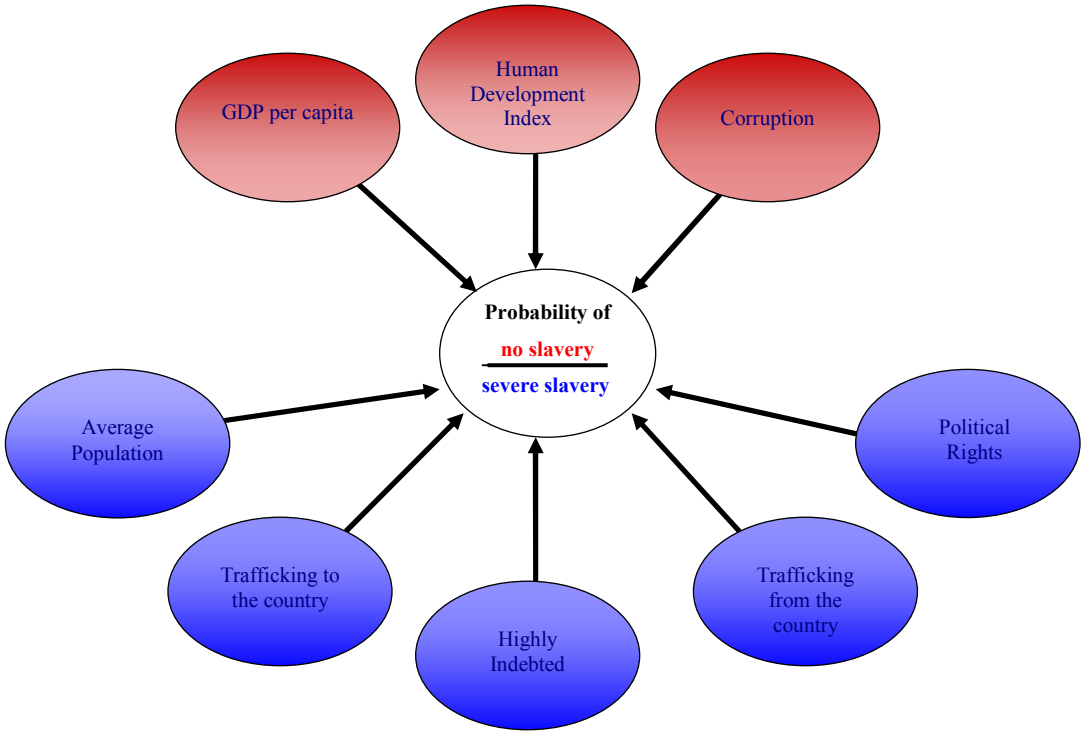
For ease of exposition, diagram (1) encapsulates the results of model (2). The diagram shows the variables which influence both, the probability of no slavery in any particular country and the probability of slavery present in several economic sectors in a country.

The variables in red are those whose coefficients are negative in our model. Accordingly, an increase in their value is said to increase the probability of the first category of our categorical dependent variable, that is, the probability of a country having no slavery. Therefore, following the diagram, we can say that an increase in the value of GDP per capita, the HDI or the corruption index (which is associated with lower corruption levels), increase the probability that any one country will have no slavery, other things being equal.

Similarly, the variables in blue are those whose coefficients are positive in our model. Correspondingly, an increase in their value is believed to increase the probability of the last category of our categorical dependent variable, that is, the probability of slavery in several economic sectors of a country. Therefore, the diagram shows how increases in the average population, the degree of trafficking both, to and from a country, whether the country is highly indebted or an increase in the political rights index (which is consistent with more abuses), will all increase the probability that slavery will be a regular feature in several economic sectors in any one country, other things being equal.

Another way of viewing the results is by saying that, given any two countries which were similar in respect of every characteristic except, for example, the GDP per capita, the negative sign in the coefficient implies that, ceteris paribus, the country with higher GDP per capita has a lower probability of having slavery in several economic sectors and higher probability of no slavery than the country with lower GDP per capita.

Diagram 1. Model (2) – Ordered Logit Estimation Results for Slavery



To derive more information from these estimated coefficients, Table 6 in Appendix 1 shows the derivatives of the five probabilities for the selected explanatory variables of Model (2) in Table 5. These derivatives are also known as the marginal effects, as they tell us how the probabilities change given a marginal increase in an individual variable. Before interpreting the results in Table 6, it is important to note that, in order to calculate the marginal effects shown in Table 6 in Appendix 1, the values in Table 7 were used.

The last row in Table 6 shows the discrete predicted probabilities for each slavery category, calculated at the sample means of the independent variables. That is, it gives the values for $P(Y_i=0,1,2,3,4)$ individually. They all add up to one, as one would expect. However, the means for variables such as the dummy for indebted countries, and the categorical variables indicating the degree of trafficking to and from a country, with only a four point categorical scale, may not have much meaning. Instead, one could calculate these discrete predicted probabilities using the means of the continuous variables[19] and the median for the three discrete variables, that is, 'dsevere', 'traffickingto' and 'traffickingfrom'. This is done using expressions (6) to (10) above, for which we would need some of the information presented in Table 7. The results are shown in Table 8 in

[19] Corruption and Political rights are treated here as continuous, given they all have seven to ten different scale points.

Appendix 1. This table reveals that our model is not able to mimic perfectly the probabilities of the population.

From Table 6, leaving aside the relatively high probability values shown in brackets, we can see how the marginal effects of the independent variables affect the probabilities of slavery. For example, an increase in the population of a given country increases the probability of a country having persistent and substantial amounts of slavery, but decreases the probability of no or little slavery. An increase in the score on the Human Development Index, that is, an improvement in the general well-being of the population of a given country, decreases the probabilities of a country suffering persistent and substantial amounts of slavery and increases the probability of a country suffering no or little slavery. Similarly for the GDP per capita of a country. Therefore, as one would expect, the more populated a country is, the higher the supply of potential slaves, and the higher the probability of a country having substantial amounts of slavery. Likewise, the more developed a country, and the richer its people, the lower the probability of slavery in the country.

A marginal increase in the corruption indicator, which reflects a lower level of corruption in the country, increases the probability of no or little slavery, while it decreases all the other probabilities. The Political Rights indicator tells us that a marginal increase in the indicator, which means a lower respect for the political rights in a country, decreases the probability of no or little slavery, and increases all the others. Therefore, institutional variables such as these prove to affect the level of slavery in a given country, with corruption and low respect for political rights increasing the chances of a country suffering from slavery.

The trafficking to and trafficking from variables basically predict that, as trafficking to and from a country increases, the chances of no or little slavery in that particular country decrease, and increase the likelihood of substantial and persistent slavery.

Finally, a marginal change in the dummy variable ‘dsevere’ is a discrete change from 0 to 1, a change to a situation of severe indebtedness. As expected, such marginal change, increases the probabilities of slavery in a country.

The numbers in parentheses in Table 6 in Appendix 1 are the probability values for these calculated marginal effects. Most are significant at the 10 percent level. It is interesting to note, however, the marginal effects for the category of no slavery is the worse in terms of probability values, as hardly the ‘pop95’, ‘hdi95’, ‘gdpppp95’, and ‘polright’ are not even significant at the 10 percent level.

Specification Analysis

In this section, we will examine the results of the ordered logit model in which different variables are included to test for different effects.

In column (3) in Table 5 in Appendix 1 we test whether the effect of the GDP per capita on slavery is nonlinear, by introducing the square of GDP as an additional variable. The

coefficient for this new variable is not significant, and the model is quite similar to Model (1). When introducing the square of GDP per capita with the dummy 'dsevere', the results[20] do not vary much from those in Model (2), and the coefficient for GDP per capita is still not significant.

In columns (4) and (5) in Table 5, initial values for the Human Development Index and the GDP per capita are used, so as to see whether slavery was better explained by earlier economic situations in the countries, rather than by their contemporaneous circumstances. In column (4), the 'hdi' and the GDP per capita for 1975 instead of for 1995 are introduced. The signs of the coefficients suggest the probability of slavery in any particular country increases the higher the values of the 'hdi' and the GDP per capita 20 years earlier. However, the coefficient for the 'hdi' is very insignificant. The significance of the GDP per capita coefficient can be interpreted as indicating that, the higher the value of the GDP per capita in a country, the most likely slavery will be present some 20 years later. The GDP per capita in this case works as an indicator of the well-being of a country economy and its standards of living. The higher its value, the greater the number of people from lower GDP per capita countries such country will attract as migrants in search of better living conditions. Experience shows how vulnerable migrants, against all expectations, end up often in exploitative labour conditions instead.

Finally, column (6) in Table 5 introduces the GDP growth variable, instead of the GDP per capita. The positive coefficient tells us that the probability of slavery in a country increases the greater the growth in the country in the period 1960-1995. It is usually believed that countries with lower GDP per capita tend to grow at faster rates. However, evidence from growth literature has shown many countries, especially in Sub-Saharan Africa, have not experienced such trends and they do not appear to be catching up (Temple, 1999:116). In our case, on average, as shown in Table (b), countries with higher scores in slavery have lower GDP per capita figures, but, in accordance to the growth literature, they do not show higher GDP growth rates. Therefore, the estimated coefficient on the GDP growth variable is somehow contradictory.

Table (b). GDP growth rates by Slavery Category.

Category	GDP per capita 1995	GDP growth
0	**12,731.6**	**1.27**
1	**10,977.1**	**2.07**
2	**4,750.8**	**0.17**
3	**4,276.1**	**1.66**
4	**2,646.5**	**1.03**

[20] Not shown here.

In Table 9 in Appendix 1, the effects of the labour force composition are introduced. In column (1) the size of the child labour force in each country is introduced, so as to examine its effects on the probability of slavery in a given country. The highly significant estimate shows the probability of slavery increases the higher the percentage of the child labour force. The coefficient does not change the signs or the significance of the coefficients of the other included variables very much, except in the case of the Human Development Index ('hdi'). This is due to the high correlation there is between the two variables, namely, the higher the peoples' well-being in a country, the lower the need for a child population to be actively engaged in the economy. The linear correlation coefficient between the two variables is -0.87, which is comparatively high with respect to the rest of the linear correlation coefficients of the 'hdi' with the other included variables in the model. Furthermore, 'hdi' is now positive and not statistically significant. This is, however, an interesting result. This tells us that, after controlling for the child labour force in each country, other things being equal, the higher the development in the country, the higher the probability of slavery. This may be explained by the attraction developed countries posed to the populations of poor countries, reflected in the flows of migrants from under-developed and developing countries to the more developed ones (considering both legal and illegal migration).

In column (2) we introduce the labour force growth from 1961 to 1995 as an explanatory variable. This variable is insignificant, and it adds little to our original estimated model, column (2) of Table 5.

Column (3) shows an interesting result. When the size of the labour force in a given country is introduced as an explanatory variable, the sign of its estimated coefficient suggests the probability of no slavery in a country increases the bigger the size of the labour force, that is, the greater the number of people available for work, the greater the chances of no slavery. Such unintuitive finding at first could be explained if we look at the definition of the variable 'lf'. As explained above, its definition specifically excludes workers in the informal sector. Moreover, it does not take into account those discouraged workers who fail to register as unemployed. Therefore, if we consider the size of the labour force as the number of people available for work in the formal economic sectors, and properly registered, this result may be indicative of the importance of reducing the informal sector in a particular economy. If we adventure such a view, what this outcome may be telling us is that the larger the number of people engaged in the nonmarket economy, the lower the chances of no slavery. The coefficient is only just significant at the 10% level of significance.

Columns (4) and (5) in Table 9 introduce the labour force as a percentage of the total population, 'lf/pop'. The positive sign of the estimate in column (4) indicates that, the higher the percentage of the labour force in a given country, the higher the probabilities of finding slavery in many of the economic sectors of such country. This conforms with a priori expectations, even though the estimate is statistically insignificant. Leaving out the population variable hardly changes anything in terms of statistical significance, most probably because the direct linear correlation between both variables is quite low (0.142).

Regional and Cultural Type Effects

Table 10 in Appendix 1 introduces the regional dummies in columns (1) and (2), and the cultural types in columns (3) and (4).

Regional Effects

The benchmark model is that presented in Table 5, column (2) in Appendix 1. Column (1) of Table 10 introduces the regional dummy variables. The regression coefficients for the dummy variables in the model are interpreted as representing the effect of being in a particular category relative to the reference category, which is the dummy category left out in the estimations so as to avoid a perfect multicollinearity problem. Our reference category in this case is the 'sa', that is, the dummy associated with the South Asian region. This category is the one with the greatest pivotal influence, as it is shown in Table (c) below. Despite being the second lowest category in terms of number of countries it represents, it is, by far, the one with the greatest number of average estimated slaves.

Table (c). Estimated[21] Average Number of Slaves per Country

Region	Number of Countries	Number of Slaves
Eap	**17**	**24,759**
Eca	**28**	**3,714**
Lac	**25**	**12,094**
Mena	**20**	**1,950**
Na	**2**	**70,000**
Sa	**7**	**3,334,036**
Ssa	**43**	**12,805**
We	**16**	**5,044**

At the onset, it is worth noting, even if only suggestively, that introducing the regional dummy variables increases the Pseudo-R^2 from 0.335 in our benchmark model, to 0.387 in column (1) of Table 10. The value for the Likelihood Ratio (160.62) also points to an overall significance of all variables here included. Looking at the individual estimates, we can first observe all dummy variables have a negative sign and are statistically significant[22]. What this is telling us is that all countries which belong to any of the regions included, when compared to the countries of the South Asian region, other things being equal, have more probabilities of having no slavery. Then again, the reason for this is the high incidence of contemporary forms of slavery in the South Asian region in comparison to any other region in the world.

[21] Estimations provided by Bales (various years).

[22] Only the coefficient for the 'Na' regional dummy fails to reach the usual rule-of-thumb of a z-statistic close or greater than 2. (This rule-of-thumb generally applies to the t-statistics in Ordinary Least Squares (OLS) regressions. Here we are assuming the z-statistics of the Ordered Logit estimates in parentheses play a similar role to that of the t-statistics in OLS).

Column (2) in Table 10 leaves out the population and the GDP per capita variables. This is done so as to show the heavy regional component these variables contain. When the dummy variables were included in column (1), the population, the 'hdi' and the GDP per capita all changed in statistical significance and the 'hdi', in addition, changed sign. Once more, column (2) shows how, after taking regional effects into account, the 'hdi' change of sign, leaves us with the interpretation that, ceteris paribus, the more advanced the country, the higher the probability of slavery in many of its economic sectors. This is however not statistical significant, even after the exclusion of the population and the GDP per capita variables.

Cultural Type

We proceed in a similar way with regards to the cultural types. Results are shown in Columns (3) and (4) of Table 10 in Appendix 1. As above, we first present Table (d) with the average estimated number of slaves per cultural type, so as to find which of all the dummies is the most appropriate as a reference category. From Table (d) is easy to see the pivotal category in this case is 'budhindu', which categorises a country as primarily Buddhist or Hindu.

Table (d). Estimated Average Number of Slaves per Cultural Type.

Cultural Type	Number of Countries	Number of Slaves
African	**34**	**7,260**
Budhindu	**12**	**1,698,917**
Eas	**9**	**38,722**
Islam	**48**	**73,567**
Latin	**27**	**8,526**
Orthodox	**15**	**5,640**
Western	**38**	**11,380**

From both, columns (3) and (4) in Table 10, we can appreciate a suggestive improvement in terms of overall significance, in we look at the Pseudo-R^2, which has also increase in comparison to our benchmark model in Table 5. The Likelihood Ratio also points that at least one of the variables included in the model is significant, against the null hypothesis of all of them being of no statistical significance. Looking at the coefficient estimates individually, we can also see how all cultural type dummies have negative coefficients. This implies that any country, with respect to the countries in the reference category, keeping all other things constant, have more probabilities of experiencing no slavery. However, the inclusion of these dummies drives a certain number of variables insignificant. In this case, the 'hdi', the GDP per capita and the 'polright' variables are all very insignificant. This may be given these variables contain a considerable cultural type component.

Whatever the case, it seems regional dummies are more meaningful in explaining differences in the probabilities of a country experiencing contemporary forms of slavery than a cultural type would. Cultural types also contain a heavy regional component, so I

am more inclined towards regional analysis instead of discriminating in terms of cultural types, especially given the controversies surrounding such categorisation.

Conclusions and Way Forward

This preliminary cross-sectional analysis has revealed that, in explaining the probabilities of a country suffering from slavery a country's population, development and income per capita are important factors. In addition, countries with higher corruption levels and lower respect for the political rights of its citizens are more likely to encounter greater number of people working under extremely exploitative conditions. The scope of trafficking also affects the probability of slavery, as it may be that those people who are being trafficked to and from the country, due to their legal position and vulnerability, may end up being enslaved. Furthermore, the greater the external debt of the world's poorest, or, as classified by the World Bank, the most heavily indebted the country, the greater the chances of slavery.

This study also provided an introductory snapshot of the possible regional and cultural effects in determining the level of slavery in a particular country, which would need to be further considered.

Historical studies are believed to serve better in explaining the driving factors of country differences in certain economic variables, slavery being just one more of them. However, as this cross-sectional study has proved, there is plenty of scope to investigate whether empirical results echo the theoretical hypotheses put forward by historians in a much wider framework. In general, this has been the case. However, there are also limitations with cross-sectional analysis as discussed previously. Further analysis is called for in order to bring a much greater understanding of the interconnections between the individual variables.

In particular, initial findings such as these reported here suggest that there appears to be significant scope for further research and analysis. The existence of contemporary forms of slavery has remarkable implications. However, to facilitate this future research, more comprehensive and comparable data collection needs to be made available, which would lead to better understanding and to accurate policy prescriptions. This not only applies to aggregate cross country data, but also within country data on the prevalence of slavery since examination of detailed micro data should produce a much clearer understanding of the important issues. This will be attempted in subsequent chapters.

Appendix 1.

Table 1. Summary of Previous Studies

Authors	Form of slavery	Studying	Data Collection	Method	Scope
Kielland *et al.* (2001)	Trafficking	Causes	Primary: Survey	Logistic Regression	Benin and adjacent countries
Kundu *et al.*	Debt Bondage	Causes	Primary: Survey	Principal Components	Regions of India and Nepal
Bales (2000)	Trafficking	Causes	Secondary	OLS Regression	Cross-Section of countries
Smith (2002)	Slavery	Consequence	Secondary	Hierarchical Linear Model	Cross-Section of countries
Present	Slavery	Causes	Secondary	Ordered Logit Regression	Cross-Section of countries

Table 2. Descriptive Statistics

Variable	Slavery Category	Minimum Value	Country with Minimum	Maximum Value	Country with Maximum
Fertility	0	1.6	Latvia	5.6	Nicaragua
	1	1.6	Estonia	6.2	Djibouti
	2	1.4	Georgia	7.3	Somalia
	3	2.7	China	7.0	Yemen
	4	4.2	Thailand	7.3	Niger
Child Mortality	0	14.5	Norway	128.0	Nicaragua
	1	12.5	Sweden	278.5	Guinea
	2	10.0	Croatia	277.0	Angola
	3	71.0	Kuwait	364.0	Gambia
	4	74	Sao Tome	376.0	Mali
Child Population	0	18.9	Finland	65.2	Norway
	1	15.0	Italy	46.4	Guinea
	2	16.0	Japan	48.6	Uganda
	3	26.0	China	51.5	Chad
	4	28.0	Thailand	48.4	Niger
Working Population	0	19.0	Finland	65.2	Norway
	1	18.3	Slovenia	71.3	Singapore
	2	25.0	Uruguay	69.5	Japan
	3	42.6	Bhutan	71.3	Qatar
	4	31.7	Burma	67.0	Thailand
Child Labour Force	0	0	Various	14.0	Nicaragua
	1	0	Various	34.0	Guinea
	2	0	Various	45.3	Uganda
	3	0	Various	55.1	Bhutan
	4	0	Saudi Arabia	54.5	Mali

Table 3. Means by Slavery Category

	No Slavery	Little Slavery	Persistent Slavery	Few Slavery Sectors	Many Slavery Sectors
Hdi95	0.825	0.761	0.639	0.513	0.538
Hdi75	0.839	0.731	0.554	0.368	0.443
Popgr6095	1.163	1.691	2.053	3.046	2.572
Fert	2.922	3.614	4.472	5.792	5.523
Childmort	40.6	72.6	113.4	212.5	176.0
Gdpppp75	3,400	3,547	1,951	2,734	1,219
Gdpppp95	12,723	11,014	5,183	3,488	3,042
Perchildpop95	26.69	28.81	35.28	42.05	40.41
Perworkpop95	62.58	62.69	58.56	54.70	55.97
Pop95	3,137,056	17,608,535	26,394,791	73,925,461	88,585,882
Gdpgrowth	1.27	2.00	-0.20	1.66	1.38
Childlf95	1.82	3.33	12.98	25.22	21.96
Lfgr6195	1.52	1.99	2.10	3.05	2.58
Lf95	1,490,800	8,410,057	12,094,600	41,144,591	40,959,375
U95	11.84	10.44	11.10	15.82	11.37
Corruption	6.54	5.13	3.52	2.9	2.84
Hrabuse	2.61	5.36	8.65	9.95	11.5
Ethnicfr	19	29.23	47.16	59.07	52.19
Coups	0.2	0.7	0.9	1.3	1.2
Revol	1.6	4.0	5.3	6.2	7.7
Govcris	4.4	6.5	5.6	2.5	5.1
Assass	1.6	7.6	5.6	1.5	6.8
Sec95	96.9	81.6	59.6	42.8	39.1
Prim95	98.4	98.0	98.8	84.0	87.1
Pupilteach95	22.6	22.8	28.5	38.8	42.9
Ruleoflaw	5.7	5.6	5.5	3.6	4.6
Goveff	4.9	4.7	4.4	3.2	4.1
Instab	4.5	4.2	4.1	2.8	3.8
Voice	3.8	3.9	3.5	2.7	3.2
Press	22.6	37.3	55.1	65.0	56.7
Polright	1.1	2.5	4.2	5.5	4.2
SocialSec	6:8	29:50	25:48	1:17	1:17

Table 4. Cultural Type and Regional Variables by Slavery Category.

	No Slavery	Little Slavery	Persistent Slavery	Few Slavery Sectors	Many Slavery Sectors
African	0	4	15	10	1
Buddhist	0	1	2	1	2
Hindu	0	0	0	0	2
Islam	0	9	17	10	7
Japan	0	0	1	0	0
Latin	2	15	5	0	1
Orthodox	1	5	5	0	0
Sinic	0	2	1	1	0
Western	6	18	8	0	2
Sa	0	0	2	2	3
Mena	0	8	6	5	1
Eap	1	5	6	2	3
Lac	1	17	5	0	2
Ssa	0	3	19	13	8
Eca	2	10	16	0	0
Na	0	2	0	0	0
We	5	10	1	0	0

Table 5. Ordered Logit Estimation Results for Slavery.

	(1)	(2)	(3)	(4)	(5)	(6)
No. observations	146	146	146	146	146	145
No. of explanatory variables	7	8	8	7	8	7
Pop95	1.98e-09	2.18e-09	2.17e-09	1.30e-09	1.72e-09	1.83e-09
	(1.61)	(1.80)	(1.72)	(1.08)	(1.41)	(1.47)
	0.108	*0.072*	*0.085*	*0.281*	*0.159*	*0.141*
Hdi95	-3.106	-2.362	-2.888	—	-2.706	-2.968
	(-2.53)	(-1.88)	(-2.30)		(-2.17)	(-2.47)
	0.011	*0.060*	*0.021*		*0.030*	*0.014*
Hdi75	—	—	—	0.003	—	—
				(0.35)		
				0.728		
Gdpppp95	-0.007	-0.007	-0.020	—	-0.005	—
	(-1.59)	(-1.70)	(-1.15)		(-1.25)	
	0.111	*0.090*	*0.248*		*0.212*	
Gdpppp95s	—	—	0.0001	—	—	—
			(0.79)			
			0.430			
Gdpppp75	—	—	—	0.013	0.011	—
				(2.07)	(1.98)	
				0.039	*0.048*	
Gdpppp75s	—	—	—	—	—	—
Gdpgrowth	—	—	—	—	—	0.058
						(1.17)
						0.241
Corruption	-0.381	-0.312	-0.379	-0.471	-0.382	-0.405
	(-2.96)	(-2.38)	(-2.94)	(-3.61)	(-2.93)	(-3.08)
	0.003	*0.017*	*0.003*	*0.000*	*0.003*	*0.002*
Polright	0.159	0.172	0.167	0.320	0.212	0.179
	(1.65)	(1.77)	(1.72)	(3.27)	(2.08)	(1.88)
	0.099	*0.077*	*0.085*	*0.001*	*0.037*	*0.060*
Traffickingto	0.755	0.789	0.742	0.572	0.671	0.671
	(3.37)	(3.43)	(3.31)	(2.51)	(2.93)	(2.95)
	0.001	*0.001*	*0.001*	*0.012*	*0.003*	*0.003*
Traffickingfrom	0.746	0.849	0.728	0.948	0.817	0.776
	(3.05)	(3.39)	(2.96)	(3.77)	(3.29)	(3.14)
	0.002	*0.001*	*0.003*	*0.000*	*0.001*	*0.002*
Dsevere	—	1.205	—	—	—	—
		(2.76)				
		0.006				
Log-Likelihood (0)	-205.598	-207.598	-207.598	-207.598	-207.598	-205.536
Log-Likelihood (M)	-141.992	-138.099	-141.680	-141.234	-140.003	-140.291
LR χ^2(n)	131.21	139.00	131.84	132.73	135.19	130.49
Prob> χ^2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R^2	0.316	0.335	0.318	0.320	0.326	0.3174
δ_1	-4.934	-3.630	-5.074	-1.675	-4.045	-4.523
δ_2	-0.591	-0.775	-0.716	2.725	0.271	-0.150
δ_3	2.177	3.679	2.070	5.436	3.069	2.696
δ_4	3.587	5.178	3.485	6.882	4.558	4.042

Table 6. Marginal Effects

	$\frac{\partial P(Y_i = 0)}{\partial x_i}$	$\frac{\partial P(Y_i = 1)}{\partial x_i}$	$\frac{\partial P(Y_i = 2)}{\partial x_i}$	$\frac{\partial P(Y_i = 3)}{\partial x_i}$	$\frac{\partial P(Y_i = 4)}{\partial x_i}$
Pop95	-1.32e-11	-4.71e-10	2.92e-10	1.42e-10	5.04e-11
	(0.210)	(0.073)	(0.095)	(0.104)	(0.111)
Hdi95	0.144	0.512	-0.317	-0.154	-0.055
	(0.187)	(0.058)	(0.084)	(0.080)	(0.096)
Gdpppp95	0.00004	0.002	-0.001	-0.0004	-0.0001
	(0.207)	(0.089)	(0.108)	(0.120)	(0.136)
Corruption	0.002	0.068	-0.042	-0.020	-0.007
	(0.098)	(0.024)	(0.048)	(0.033)	(0.062)
Polright	-0.001	-0.037	0.023	0.011	0.004
	(0.183)	(0.082)	(0.112)	(0.091)	(0.121)
Traffickingto	-0.005	-0.171	0.106	0.052	0.018
	(0.087)	(0.001)	(0.009)	(0.007)	(0.020)
Traffickingfrom	-0.005	-0.184	0.114	0.055	0.020
	(0.091)	(0.001)	(0.009)	(0.008)	(0.019)
Dsevere	-0.006	-0.230	0.099	0.098	0.039
	(0.107)	(0.002)	(0.017)	(0.038)	(0.070)
Predicted Probabilities	0.006	0.329	0.567	0.074	0.024

Table 7. Selective descriptive statistics.

Variables	Mean	Std. Dev.	Median
Pop95	3.53e+07	1.24e+08	8172500
Hdi95	0.665	0.192	0.7145
Gdpppp95	60.335	41.710	58.5
Corruption	4.088	2.010	3
Polright	3.591	2.225	3
Traffickingto	2.190	0.998	2
Traffickingfrom	2.424	1.130	2
Dsevere	0.259	0.440	0

Table 8. Discrete Predicted Probabilities.

Discrete Probabilities	Population	Sample
P(Y=0)	0.057	0.013
P(Y=1)	0.348	0.173
P(Y=2)	0.348	0.766
P(Y=3)	0.139	0.037
P(Y=4)	0.108	0.011
Total	1	1

Table 9. Additional Ordered Logit Estimation Results for Slavery.

	(1)	(2)	(3)	(4)	(5)
No. obs.	142	143	143	143	143
No. of expl. var.	9	9	9	9	8
Pop95	2.44e-09	2.40e-09	2.35e-08	2.16e-09	—
	(1.93)	(1.95)	(1.29)	(1.70)	
	0.054	*0.051*	*0.195*	*0.090*	
Hdi95	3.490	-2.693	-2.838	-2.559	-2.226
	(1.53)	(-2.05)	(-2.09)	(-1.95)	(-1.74)
	0.126	*0.041*	*0.037*	*0.051*	*0.083*
Gdpppp95	-0.007	-0.007	-0.007	-0.007	-0.006
	(-1.58)	(-1.60)	(-1.56)	(-1.52)	(-1.46)
	0.115	*0.109*	*0.118*	*0.127*	*0.144*
Childlf95	0.079	—	—	—	—
	(3.27)				
	0.001				
Lfgr6195	—	0.211	—	—	—
		(1.28)			
		0.201			
Lf95	—	—	-3.70e-08	—	—
			(-1.20)		
			0.118		
Lf/Pop95	—	—	—	2.091	3.085
				(0.77)	(1.17)
				0.441	*0.244*
Corruption	-0.355	-0.320	-0.325	-0.341	-0.350
	(-2.80)	(-2.41)	(-2.46)	(-2.58)	(-2.65)
	0.005	*0.016*	*0.014*	*0.010*	*0.008*
Polright	0.229	0.150	0.217	0.214	0.235
	(2.22)	(1.41)	(2.13)	(2.12)	(2.33)
	0.026	*0.160*	*0.033*	*0.034*	*0.020*
Traffickingto	0.788	0.788	0.828	0.822	0.839
	(3.31)	(3.39)	(3.54)	(3.51)	(3.58)
	0.001	*0.001*	*0.000*	*0.000*	*0.000*
Traffickingfrom	0.899	0.801	0.675	0.720	0.735
	(3.34)	(3.07)	(2.60)	(2.79)	(2.87)
	0.001	*0.002*	*0.009*	*0.005*	*0.004*
Dsevere	1.342	1.216	1.097	1.188	1.147
	(2.96)	(2.71)	(2.43)	(2.68)	(2.60)
	0.003	*0.007*	*0.015*	*0.007*	*0.009*
Log-Likelihood(0)	-202.228	-203.265	-203.265	-203.265	-203.265
Log-Likelihood(M)	-128.460	-133.970	-133.502	-134.465	-136.074
LR χ^2(n)	147.54	138.59	139.53	137.60	134.38
Prob> χ^2	0.000	0.000	0.000	0.000	0.000
Pseudo R^2	0.365	0.341	0.343	0.339	0.331
δ_1	1.337	-3.654	-4.052	-2.968	-2.247
δ_2	5.679	0.759	0.282	1.354	2.087
δ_3	8.903	3.742	3.276	4.372	5.051
δ_4	10.581	5.321	4.858	5.918	6.534

Table 10. Regional and Cultural Estimations of Ordered Logits.

	(1)	(2)		(3)	(4)
No. obs.	146	146	No. obs.	143	147
No. of var.	15	13	No. of var.	14	12
Pop95	1.29e-09	—	Pop95	3.17e-09	3.11e-09
	(0.95)			(2.08)	(2.06)
	0.340			*0.038*	*0.040*
Hdi95	1.874	2.036	Hdi95	-0.272	—
	(1.16)	(1.31)		(-0.17)	
	0.246	*0.190*		*0.863*	
Gdpppp95	-0.0001	—	Gdpppp95	-0.002	—
	(-0.03)			(-0.51)	
	0.980			*0.610*	
Corruption	-0.410	-0.431	Corruption	-0.426	-0.426
	(-2.64)	(-2.82)		(-2.94)	(-3.08)
	0.008	*0.005*		*0.003*	*0.002*
Polright	0.279	0.290	Polright	0.133	0.150
	(2.49)	(2.70)		(1.05)	(1.23)
	0.013	*0.007*		*0.291*	*0.218*
Traffickingto	0.804	0.831	Traffickingto	0.862	0.881
	(3.18)	(3.31)		(3.39)	(3.53)
	0.001	*0.001*		*0.001*	*0.000*
Traffickingfrom	0.967	0.969	Traffickingfrom	0.778	0.752
	(3.49)	(3.56)		(2.86)	(2.95)
	0.000	*0.000*		*0.004*	*0.003*
Dsevere	1.141	1.121	Dsevere	1.181	1.326
	(2.45)	(2.41)		(2.58)	(2.98)
	0.014	*0.016*		*0.010*	*0.003*
Eap	-3.271	-3.249	African	-1.684	-1.749
	(-2.95)	(-3.09)		(-1.84)	(-1.97)
	0.003	*0.002*		*0.066*	*0.049*
Eca	-4.776	-4.962	Budhindu	—	—
	(-3.98)	(-4.59)			
	0.000	*0.000*			
Lac	-4.014	-4.158	Eas	-3.507	-3.559
	(-3.33)	(-3.83)		(-2.54)	(-2.66)
	0.001	*0.000*		*0.011*	*0.008*
Mena	-3.388	-3.577	Islam	-1.516	-1.707
	(-2.78)	(-3.17)		(-1.67)	(-1.93)
	0.005	*0.002*		*0.095*	*0.054*
Na	-3.448	-3.401	Latin	-2.982	-3.146
	(-1.73)	(-1.79)		(-2.80)	(-3.14)
	0.083	*0.074*		*0.005*	*0.002*
Sa	—	—	Orthodox	-3.502	-3.604
				(-3.03)	(-3.27)
				0.002	*0.001*
Ssa	-2.229	-2.412	Western	-2.332	-2.459
	(-2.12)	(-2.52)		(-2.11)	(-2.37)
	0.034	*0.012*		*0.035*	*0.018*
We	-3.839	-3.919			
	(-2.92)	(-3.13)			
	0.003	*0.002*			
Log-Likelihood(0)	-207.598	-207.598	Log-Likelihood(0)	-202.124	-208.197
Lg-Likelihood(M)	-127.289	-127.771	Lg-Likelihood(M)	-127.947	-132.455
LR χ^2(n)	160.62	159.65	LR χ^2(n)	148.36	151.48
Pseudo R^2	0.387	0.385	Pseudo R^2	0.367	0.364

Appendix 2: More definitions.

The variable 'popgr' is the average annual population growth from 1960 to 1995. It is calculated as the average of the annual percentage growth of the population, figures reported in the WDI data set.

The 'gdpgrowth' variable is calculated following Barro (1991, 1999) as the average of the growth rate of real per capita GDP from 1960 to 1995, values taken from the WDI database.

The variable 'fert' is the average fertility rate of total births per woman 1960-1995 for each of the countries in the sample. Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with prevailing age-specific fertility rates. The average has been calculated following Barro's (1991) suggestions, and taken from the WDI database, various years.

The variable 'childmort' represents the average of the year under-5 mortality rate in the period 1960-1995. It is the probability that a newborn baby will die before reaching age five, if subject to current age-specific mortality rates. The probability is expressed as a rate per 1,000. It is taken from the WDI database, and its construction follows Barro (1991).

The variable 'perchildpop' gives the percentage of the total population, which are children aged 0-14, for 1995 for each of the countries. The figures come from WDI, various years.

The variable 'perworkpop' represents the percentage of the total population of ages 15-64, or working population as suggested in Barro (1991). As defined by the WDI database, total population between the ages 15 to 64 is the number of people who could potentially be economically active.

The variable 'u95' mainly comes from the WDI database, in which unemployment is defined as the share of the labour force that is without work but available for and seeking employment. An important caveat of this series is that definitions of labour force and unemployment differ by country. In addition, for those countries in which data was not available in the WDI, a wide range of other sources was consulted, in order to reach certain approximations. The World Bank database on its gender web link, the ILO Labourstа and the CIA WorldFact Book were all consulted.

'Hrabuse' reports Human Rights Abuses. Its values range from 0 to 24, higher numbers indicate a greater number of human rights abuses perpetrated by the state or state actors. This index, taken from an Observer newspaper special report, published in 1999, was formulated on the following criteria. '[The Observer has] produced a simple ranking of incidence of abuse by head of population, under 10 general headings. These comprise: the incidence of extra-judicial executions; disappearances; torture and inhumane treatment; deaths in custody; prisoners of conscience; unfair trials; detention without

charge or trial; existence of the death penalty; sentences of death; and abuses by armed opposition groups'. Thus the scores relate to 'the intensity of the abuses in each country'. From www.guardian.co.uk/rightsindex/0,2759,201749,00.html

'Ethnicfr' indicates the probability of any person you encounter of being of your same ethnic background. The lower the number, the greater the diversity within a country. It is provided by the World Bank as a Fixed Effect in their 'Social Indicators' database.

'Coups' gives the total number of extraconstitutional or forced changes in the tip government elite and/or its effective control of the nation's power structure in the corresponding period, when data was available. The term "coup" includes, but is not exhausted by, the term "successful revolution". Unsuccessful coups are not counted. It covers the period from 1960 to 1988. For those countries for which data was available, this variable states the total number of coups in the period. From Arthur S. Banks Cross National Time-Series Data Archive, available at the Growth Web Page of the World Bank.

'Revol' is the number of any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government. It covers the period 1960-1993. For those countries for which data was available, this variable gives the total number of revolutions in the period. From Arthur S. Banks Cross National Time-Series Data Archive, available at the Growth Web Page of the World Bank.

'Govcris' refers to the number of any rapidly developing situation that threatens to bring the downfall of the present regime - excluding situations of revolt aimed at such overthrow. It shows the total number of such threats in the period 1960-1993. From Arthur S. Banks Cross National Time-Series Data Archive, available at the Growth Web Page of the World Bank.

'Assass' indicates the number of any politically motivated murder or attempted murder of a high government official or politician, number during the period 1960-1993. For those countries for which data was available, this variable gives the total number of assassinations in the period. From Arthur S. Banks Cross National Time-Series Data Archive, available at the Growth Web Page of the World Bank.

'Ruleoflaw' is an indicator which includes several others measuring the extent to which agents have confidence in and abide by the rules of society. The higher the number, the more people abide by society rules within a country. Constructed by Kaufmann, Kraay and Zoido-Lobatón (1999). Available at www.worldbank.org/wbi/governance/govdata2002.

'Goveff' is an indicator measures ''inputs' required for the government to be able to produce and implement good policies' (Kaufmann et al. (1999:9). The higher the number, the more effective the government is. Constructed by Kaufmann, Kraay and Zoido-Lobatón (1999). Available at www.worldbank.org/wbi/governance/govdata2002.

The variable 'instab' indicates the degree of political instability and violence in each country. It is an indicator created by Kaufmann, Kraay and Zoido-Lobaton (1997-8) and taken from their aggregate governance indicators, Available at www.worldbank.org/wbi/governance/govdata2002.

The variable 'voice' is another indicator from Kaufmann, Kraay and Zoido-Lobaton (1997-8), indicating the degree in which people are heard and the accountability of governments. Available at www.worldbank.org/wbi/governance/govdata2002.

The variable 'press' is an indicator of the degree of press freedom in each country. The ratings are taken from the Freedom House Annual Survey of Press Freedom, available at www.freedomhouse.org/research/ratings.XLS for 1995. 0-30=Free, 31-60=Partly Free, 61-100=Not Free.

'socialsec' is a categorical variable for Social Security Programmes provided by national governments throughout the world, including breakdowns by the scheme of unemployment. When a country has no provision it has a value of 0 and when it does, a value of 1. The original source is 'United States, Social Security Administration: Social Security Programs Throughout the World, 1997', but the series were taken from the Key Indicators of the Labour Market, 1999. ILO. Appendix A. Pages 577-580.

'Conflict and social unrest' was compiled by Bales (1995, 1999). As its name indicates, gives a picture of social unrest and related conflicts present in a country. The term 'conflict and social unrest' here refers to countries in which phenomenon such as civil war, ethnic violence, war, and other related social strife exist. 0 indicates no serious conflict; 1 low levels of conflict and 2 high levels of conflict.

The variable 'pupilteach' indicates the primary school pupil-teacher ratio as the number of pupils enrolled in primary school divided by the number of primary school teachers (regardless of their teaching assignment). It is taken from WDI.

The variable 'prim' is the gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music. Taken from WDI.

The variable 'sec' is the gross enrolment ratio. It is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. It is taken from WDI.

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