DOCTORAL THESIS

"Empirical Studies on Human Capital and Natural Resources"

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Contents

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Foreword

The three chapters of this thesis present econometric studies on human capital and institutions, two important drivers of economic development. The empirical model in the first chapter tries to improve on previous estimates of returns to education in Germany by taking into account the institutional features of the education system. The relationship between human capital accumulation and trade as well as the quality of institutions is analyzed in the second chapter of this thesis. The last chapter analyzes the effect of natural resource and aid rents on a country's quality of institutions.

The first chapter presents estimates of returns to education in Germany using an empirical model that captures the basic features of the German education system. It thereby overcomes some of the short-comings of previous empirical analyses. The main result is that differences in the skill premiums across graduates from different secondary schools are large. In Germany there are three types of secondary schools: lower secondary (Hauptschule), middle secondary (Realschule) and upper secondary (Gymnasium) schools. Graduates from all three types of secondary school can engage in vocational training or apprenticeship training, but only graduates from the Gymnasium can access university. The empirical results indicate that annual returns to vocational training are more than four times higher for graduates from the highest secondary school compared to graduates from a lower secondary school. Least-squares estimation biases returns to vocational education of Hauptschule graduates upward by about 20 percent and implies a downward bias of more than 60 percent for Gymnasium graduates. The chapter also studies the determinants of educational choices, showing that the parents' education level increases the probability of choosing a higher secondary school.

The second chapter examines the effect of trade on on-the-job human capital accumulation. This is central to economic growth theory, since both trade and human capital are often considered engines of economic growth. Economic theory, however, is ambiguous on whether trade increases or decreases on-the-job human capital accumulation. The chapter provides empirical evidence regarding the effect of trade on on-the job human capital examination, using data on US immigrants. It is shown that estimated returns to country-of-origin experience of US immigrants are positively correlated with trade openness as well as institutional quality of the country of origin.

The last chapter turns to the determinants of institutional quality in developing countries by addressing the question whether natural resources and aid are detrimental for the quality of institutions. It is shown that the effect of several natural resource measures on institutional quality becomes significantly negative at high levels of ethnic fractionalization. This finding is robust to a variety of econometric specifications. The results suggest that mineral and fuel abundance resource weakens institutions to the extent that it provides means and incentives to engage in civil conflict. The chapter also reaches the conclusion that in developing countries the relationship between aid flows and institutional quality is different from that between natural resources and the quality of policies and institutions. Contrary to mineral and fuel rents, aid does not seem to be associated with lower institutional quality even when ethnic fractionalization is high. This finding contrasts with previous empirical evidence concluding that aid has a negative effect on democracy which substantially exceeds the harmful effect of oil rents.

1 How different are returns to education? Evidence from German school choices

1.1 Introduction

The German education system provides a unique setup in order to address the role of secondary education. In Germany three types of secondary schools exist. This implies that the requirements for obtaining a certain German secondary school degree are relatively homogenous compared to those of a US high school degree. Consequently, the type of German secondary school degree obtained provides a rather precise statistic for the level of human capital embodied in an individual. Moreover, a large part of the German population decides to pursue some kind of vocational training. Vocational training is chosen by graduates from all types of secondary schools. Hence, the effect of the secondary school degree on returns to vocational training can be identified.

In Germany, a student chooses between three types of secondary school: Hauptschule (lower secondary school), Realschule (middle secondary school) and Gymnasium (upper secondary school). After graduating from secondary school he decides whether to invest any further in education or not. His type of secondary school degree plays an important role in this decision, as it affects his individual training costs in terms of effort and forgone earnings, as well as his comparative advantage e.g. when applying for an apprenticeship or a job. Moreover, it determines the set of post-secondary education choices the individual faces as university is usually only accessible to Gymnasium graduates.

Previous estimates of returns to education in Germany have been provided by Knoll and Störck, 1993; Winkelmann, 1994; Abraham and Houseman, 1993). Their studies concentrate on the change of returns to vocational education during the 80's. They obtain estimates of returns to education by using OLS cross-section regressions between 1984 and 1991 and include dummies for different vocational training choices as well as academic training. Secondary school degrees are either approximated by years of education or by dummies for each secondary school type.

OLS estimation entails three major issues. First, it ignores selection bias in the earnings equation. Latter arises from a truncation of the underlying errors in the earnings equation which results from the fact that educational choices are not randomly assigned across the population but rather are optimal actions. This can be solved by treating educational choices endogenously in the earnings equation. Second, the German education system suggests that the unobservables influencing secondary and post-secondary education choice may not be orthogonal. Individuals in Germany usually not only complete secondary school, but also pursue some post-secondary educational degree in order to reach a specific occupation. Access to this in turn often requires a certain secondary school degree. Hence, individuals are likely to choose their highest secondary school degree and their post-secondary education simultaneously. This suggests that given the German education system a simultaneity bias may arise if the secondary school degree is not treated endogenously in the post-secondary education decision. Third, the above approach ignores heterogeneity in returns to education. Ichino and Winter-Ebmer (1999) show that returns to schooling are heterogenous in Germany. Their estimates of annual returns to education vary significantly with subgroups and instruments. Given hetero-

geneity, instrumental variables provide consistent estimates only under very strong assumptions (see Heckman, 1997; Card, 1999). Heckman (1997), for example, shows that even estimates of returns to education among individuals which received the respective educational degree obtained by using instrumental variable techniques are only consistent if these individuals decide to participate in education without taking into consideration unobservables that influence their returns.

The estimates of the average return to post-secondary education in Germany that I present are purged from selection biases and consistent in the presence of heterogeneity of returns to education among graduates from different secondary schools. They are derived by introducing a simultaneous equation model with endogenous dummy variables and switching which captures the basic features of the German education system. The model accounts for selection into post-secondary education and considers secondary as well as post-secondary education as endogenous variables of the earnings equation.

In this chapter, I reveal differences in the behavior of post-secondary education choices and in the returns to vocational education among the three secondary school types. I analyze sensitivity of estimates to exogeneity assumptions and present earnings differentials among graduates from different secondary schools. The estimation procedure used is maximum likelihood.

The basic findings are that the three secondary school groups differ in their behavior of choosing post-secondary education, as well as in their returns to vocational training. When loosening the constraint of equal returns to vocational education, OLS reveals that annual returns are more than four times higher for Gymnasium graduates compared to Hauptschule graduates. But this is not the whole story. Endogeneity of secondary school and post-secondary education matters.

Not accounting for endogeneity leads to strong biases. OLS biases returns to vocational education of Hauptschule graduates upward by about 20% and implies a downward bias of more than 60% for Gymnasium graduates. Returns to university are more than twice as high as OLS suggests. Consequently, annual return to post-secondary education differ significantly: they are eight times higher for graduates from the highest secondary school than for graduates from the lowest secondary school.

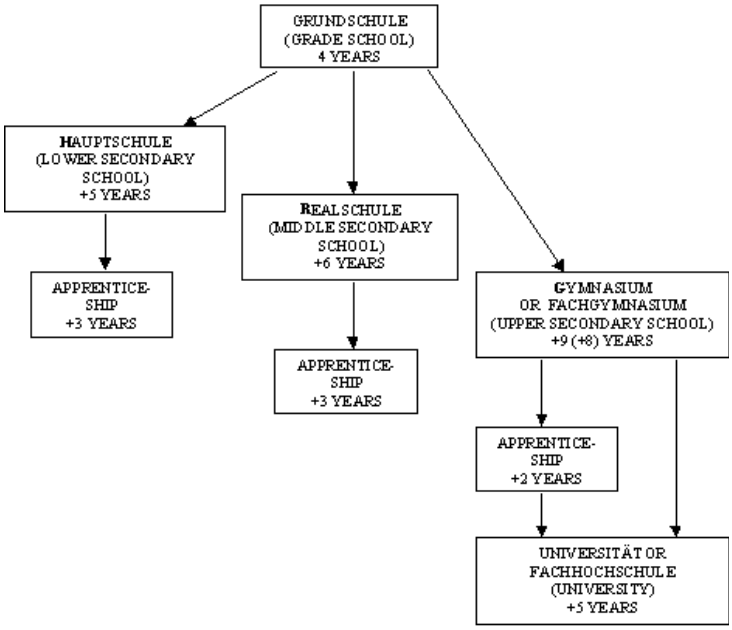
The remaining structure of this chapter is organized as follows: Next, I provide a short introduction to the German education system. The empirical model is introduced in section I.3, followed by the data description. Results are exposed in section I.5. A summary and conclusions are offered in the last section of this chapter.

1.2 Institutional background

The German education system is characterized by three types of secondary schools and a well-developed vocational training system which is mainly determined by the apprenticeship. Secondary school types differ in the years of education required to receive the respective final degree, the kind of knowledge provided to the students and the set of possible post-secondary education choices. Figure $I.1$ illustrates these basic features.

The box on the top of the graph represents Grundschule (grade school). Children enter Grundschule (grade school) at age of six. After four years they are selected into Hauptschule (lower secondary school), Realschule (middle secondary school) or Gymna-

Figure I.1. German Education System



sium (upper secondary school). The highest level of secondary school the student is allowed to attend depends on his qualifications reached in the fourth grade and the recommendation of the class teacher.

As can be seen in Figure $I.1$, the number of years of schooling which are required in order to obtain the respective final degree increases with the level of secondary school. It takes about 5 years to receive a Hauptschule degree (on the left). A Realschule student needs one year more (in the middle). Usually, 9 years of schooling are necessary for a Gymnasium degree (on the right).

The types of secondary school do not only differ in years of education but also in the knowledge that is provided to the students. In Hauptschule, students receive fundamental general education which serves as the basis for future vocational training, such as apprenticeships. The type of education offered in Realschule allows to access higher level jobs. Still, it is more practically oriented than the education taught at a Gymnasium, where the foundations for future academic studies are provided.

Consequently, it is not surprising that the set of post-secondary education choices of graduates from different types of secondary schools is not the same. As Figure I.1 shows, only graduates from the upper secondary schools can choose to go to university. Furthermore, the time required to complete an apprenticeship takes one year less for Gymnasium graduates.

Figure I.1 provides a highly stylized illustration of the German education system.[1] It focuses on the basic and by far most frequented educational tracks. This requires to ab-

[1] In reality, a big variety of schooling and post-secondary training choices exists and the number of possible educational sequences is huge. Winkelmann (1994) identifies 45 distinct training sequences in his sample. A more detailed description of German post-secondary education choices can be found in Appendix 1.

stract from differences among secondary school types which lead to the same final degree (such as Gymnasium or specialized upper secondary schools which are called Fachgymnasium) and to subsume the different post-secondary training choices below vocational training. Similarly, university also includes technical colleges. Graduates from the Gymnasium which accomplished some kind of vocational training before entering university and graduated from university, are treated as university graduates. Furthermore, I consider only the highest secondary school degree of an individual. It is this degree which finally determines his set of choices, his probability to continue with post-secondary education and his relative earnings position within a certain group of post-secondary education.

The above mentioned simplifications allow to develop an empirical model which captures the basic features of the German education system: Individuals are selected into three types of qualitatively different secondary schools and then choose whether to perform some kind of post-secondary education or not. The set of post-secondary education choices differs among the three groups, but the option to perform vocational training is feasible for all secondary school graduates. The latter allows to identify differences in the returns to post-secondary education among graduates from different types of secondary schools.

1.3 The Model

A simultaneous equation model with discrete choices translates the stylized German education system, as presented in Figure $I.1$, into an empirical model. A discrete choice model is used as secondary school and post-secondary education are described by degrees rather than years of education. This is adequate for the German education system. First, using years of education may not be appropriate within countries in which years of high school graduation may depend on the student's post-secondary education choice (see Card, 1999). Second, years of schooling does not capture the qualitative differences between the three types of secondary school. The difference between a Gymnasium degree and Realschule degree cannot be stated to be three times higher than the difference between a Realschule degree and a Hauptschule degree.[2] Third, approximating the level of education by years leads to measurement errors. For example, a student who graduates from Realschule and completes an apprenticeship invests the same amount of years in education than a Gymnasium graduate.

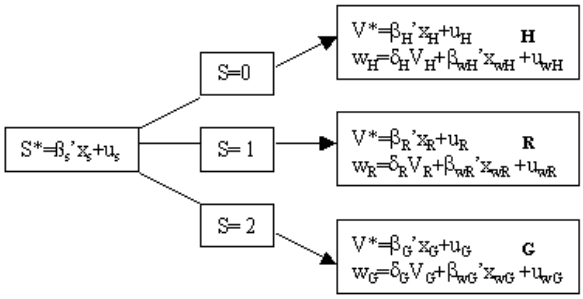
The model consists of three types of equations: the secondary school equation (dependent variable S^*), the post-secondary education equation (dependent variable V^*) and the earnings equation (dependent variable w).

The indices in the latter two equations refer to the individual's type of secondary school degree. H, R and G denote Hauptschule, Realschule and Gymnasium respectively (see figure 2).

As can be seen in Figure $I.2$, the model used is a so called switching model. The secondary school degree selects each individual into one of three groups. Conditional on his group the individual decides whether to continue with post-secondary education or not

[2] Recall that it takes five years of secondary school to receive a Hauptschule degree. To graduate from a Realschule (Gymnasium) requires one additional year (four additional years).

Figure I.2. Empirical Model



and which kind of post-secondary education to pursue. Moreover, the secondary school degree also determines to which wage group he belongs.

In what follows, I will present the equations the address estimation and finally discuss the model's basic assumptions and features.

The secondary school equation describes the German secondary school system. Corresponding to the three types of secondary schools, the observed dependent variable "secondary school degree" S assumes three values. The school degree used in this model is always the highest secondary school degree obtained by the individual. Under the assumption that secondary school levels are ordered from 0 to 2 in ascending order, the secondary school equation can be written as

$$S^* = \beta_s' x_s + u_s \tag{1}$$

with

$$\text{Hauptschule} : S = 0 \text{ iff } S^* \leq 0$$

$$\text{Realschule} : S = 1 \text{ iff } 0 < S^* \leq c_s$$

$$\text{Gymnasium} : \ S = 2 \text{ iff } c_{s\leq} S^*$$

$$u_s \sim N(0,1)$$

S denotes the level of secondary education and takes the values 0 (Hauptschule), 1 (Realschule) and 2 (Gymnasium). S^* is a latent variable. It describes the "desired" level of secondary education. The vector x_s contains information concerning the educational background of the parents. c_s is a threshold to be estimated. Normalization of the first threshold to 0 allows to include a constant term in x_s. u_s is assumed to be normally distributed with zero mean and unit variance, which permits to identify the threshold c_s.

As Hauptschule and Realschule graduates only face the choice of whether to perform vocational training or not their post-secondary education equation can be described by

means of a probit model. It is given by

$$V_i^* = \beta'_{vi} x_{vi} + u_{vi} \tag{2}$$

with

$$\text{No vocational training} : V_i = 0 \text{ iff } V_i^* \leq 0$$

$$\text{Vocational training} : V_i = 1 \text{ iff } V_i^* > 0$$

$$u_{vi} \sim N(0,1)$$

$$i = H, R$$

where H refers to Hauptschule and R to Realschule.

Again, V_i^* is a latent variable. The level of vocational education actually chosen is V_i : 0 is assigned to no vocational education and 1 to vocational training. Parental background variables are included in x_{vi}. u_{vi} has a unit variance. This assumption is not required, but as V_i^* is not observable, β_{vi} is identified only proportional to the standard deviation of the error term.

Gymnasium graduates face the additional choice of going to university. Consequently, their post secondary education equation is written as an ordered probit such that

$$V_G^* = \beta'_{vG} x_{vG} + u_{vG} \tag{3}$$

with

$$\text{No vocational training} : V_G = 0 \text{ iff } V_G^* \leq 0$$

$$\text{Vocational training} : V_G = 1 \text{ iff } 0 < V_G^* \leq c_G$$

$$\text{University} : V_G = 2 \text{ iff } c_G < V_G^*$$

$$u_{vG} \sim N(0,1)$$

V_G^* is a latent variable and the level of vocational education actually chosen is V_G. It takes the values 0 (no vocational education), 1 (vocational training) and 2 (university). x_{vG} consists of vocational background variables of the parents and c_G is to be estimated. Identification requires to impose a variance equal to 1 on u_{vG}.[3]

[3]The decision about post-secondary education does of course not only depend on the type of secondary school degree but also on expected earnings. The right variable to consider here would be the present discounted value of after tax earnings less the costs of post-secondary education. As this variable cannot be calculated and the before tax earnings of a particular year are not the appropriate measure, I do not include any variable explaining differences in earnings in equations 2 and 3. However, I use other variables which are reasonably expected to have affected the decision of which kind of post-secondary education to pursue, such as parental background variables.

The last equation in this model is the earnings equation. It is characterized by the fact that it contains the endogenous dummy variable V_i and that its error terms are allowed to be correlated with the error of the secondary school equation. The earnings equation is written as

$$w_i = \gamma_{wi} V_i + \beta'_{wi} x_{wi} + u_{wi},\ i = H, R, G \tag{4}$$

with $u_{wi} \sim N(0, \sigma_{wi})$. H, R and G refer to Hauptschule, Realschule and Gymnasium respectively.

In the case of Realschule and Hauptschule graduates, V_i is a dummy variable as defined in equation 2. For graduates from the Gymnasium, the dummy variable V is determined by equation 3 and decomposed into a variable vector (δ_v, δ_u). δ_v indicates that the Gymnasium graduate completed a vocational training program, while δ_u takes value 1 if he went to university.

The vector $(u_s, u_H, u_R, u_G, u_{wH}, u_{wR}, u_{wG})$ is assumed to consist of joint normal random variables with a finite covariance matrix and to be independent of X_s, X_{vi} and X_{wi} with $i = H, R, G$. Of the 28 different elements of the covariances matrix four variances are set equal to one, nine covariances (σ_{svH}, σ_{svR}, σ_{svG}, σ_{vwH}, σ_{vwR}, σ_{vwG}, σ_{swH}, σ_{swR}, σ_{swG}) and the variances of the three earnings equations are estimated. Twelve elements are not identified. This arises from the fact that V_H, V_R and V_G cannot be observed simultaneously for a given individual . Similarly, this is true for w_H, w_R and w_G. As a consequence, the sample observations cannot reflect the respective correlations and the corresponding covariances do not appear in the likelihood function.

The model is estimated by maximum likelihood. Under the assumption of joint normality this yields consistent and asymptotic efficient estimates. The likelihood function consists of seven states. There are two states each for Hauptschule and Realschule graduates (no vocational training, vocational training) and three states for Gymnasium graduates (no vocational training, vocational training and university). The sum of the logs of the seven likelihood contributions constitutes the log likelihood function L^* of the entire system that is

$$L^* = \sum_{i=1}^{7} \ln(L_i)$$

To describe the estimation procedure, I present the likelihood contribution of an individual in state four (Realschule with vocational training). Let $e_{wR,}$ e_R and e_S be the residuals in the earnings equation, post-secondary education equation and school equation respectively of a Realschule graduate for given parameter values and log monthly earnings. This likelihood contribution can be written as

$$\begin{aligned} L_4 &= f(e_{wR}) P(S = 1, V = 1 | e_{wR}) \\ &= f(e_{wR}) \int_{-Xs\beta s}^{c_s - X_s\beta_s} \int_{-\infty}^{-X_R\beta_R} f(e_s, e_R | e_{wR}) de_s de_R \\ &= f(e_{wR}) (\int_{-\infty}^{-X_R\beta_R} \int_{-\infty}^{c_s - X_s\beta_s} f(e_s, e_R | e_{wR}) de_s de_R \\ &\quad - \int_{-\infty}^{-X_R\beta_R} \int_{-\infty}^{-X_s\beta_s} f(e_s, e_R | e_{wR}) de_s de_R) \end{aligned} \tag{5}$$

with variance covariance matrix $\Sigma_{1R} = \begin{bmatrix} 1 & -\sigma_{vs} & \sigma_{ws} \\ -\sigma_{vs} & 1 & -\sigma_{wv} \\ \sigma_{ws} & -\sigma_{wv} & \sigma_{ww} \end{bmatrix}$

As can be seen from equation 5, $P(S = 1, V = 1|e_{wR})$ consists of two conditional probabilities which are again bivariate normal. Hence, they can be transformed to standard normal bivariate cumulative probability functions.

This parametric switching model neither restricts the coefficients among the post-secondary education equations nor among the earnings equations for Hauptschule, Realschule and Gymnasium graduates to be the same. It permits free correlation among the error terms. Thus, it does not only account for selection, that is a truncation of the underlying error terms due to individual educational choices, but also for unobserved heterogeneity among the three secondary school groups.

Post-secondary education enters the earnings equation as an endogenous dummy. This similarly allows to account for self-selection. Under the assumption of homogenous returns to education and given the same set of explanatory variables in the earnings equations the endogenous dummy variable approach is equivalent to a switching regression model. But if unobserved heterogeneity among the different educational groups exists then the dummy endogenous model is not capable of separating unobserved heterogeneity from selection. This arises from the fact that the endogenous dummy model implicitly imposes that all coefficients except the constant are the same among individuals with the same secondary school degree but different post-secondary education choices. Including interaction terms in the earnings equation relaxes this assumption. Furthermore, unobserved heterogeneity is unlikely to play a major role in the post-secondary education equation since the model already allows for differences in the unobservable components among the three secondary school groups.

Could I account for self-selection by using instrumental variable estimation techniques or two stage methods? In the presence of heterogeneity in returns to education, the necessary conditions for instrumental variable estimators to yield consistent estimates of the average return to education are likely not to be satisfied by sources of exogenous variation in educational choices (see Card, 1999; Heckman, 1997). Heckman (1997) shows that instrumental variables techniques yield only consistent estimates of returns to education among the entire population, as well as among the individuals which received the respective educational degrees, if individuals decide to participate in education without taking into consideration unobservables that influence their returns. Furthermore, in the present model neither instrumental variable techniques nor two stage estimates can be applied as the dependent variable of the post-secondary education equation V is discrete (see Lee and Maddala, 1976).

1.4 Data and Descriptive Statistics

The data set used for the empirical analysis is taken from the German 95% Sample of the Socioeconomic Panel (GSOEP). It consists of observations on full-time working German males in dependent employment who are younger than 59 and who provide information on parental background. 1702 individuals altogether, 971 with Hauptschule degree, 346 with Realschule degree and 385 with a Gymnasium degree fulfill these requirements for the sample period 1984 to 1990. For each of these individuals one observation is used.[4]

Data restrictions arise from the fact that no information on the grades of the individual at the end of grade school or some other ability measure are at hand. When measuring returns to education, an omission of these variables could lead biased OLS estimates. The bias would arise as individuals with a higher ability are expected to earn more and to stay in school longer, so that the contribution from unobserved ability on productivity cannot be separated from that of education. However, as far as the same type of ability affects the degree of secondary school, post-secondary education choices and earnings, the free correlation among the error terms in my model at least partially accounts for ability.

Several variables that affect the post-secondary education decision are not available in the GSOEP, such as for example the federal state where the individual went to school or parents' marital status and income. Given that higher income lowers the opportunity cost of funds to finance education, individuals with richer parents are more likely to attain post-secondary education. Fortunately, the GSOEP provides rather extensive information on parents' educational attainment and labor market status which allow to proxy family income. Information on the number of brothers and sister is available. However, I do not use it as non-responses are very high. Individuals with more brothers and sisters, are less likely to continue with post-secondary education as it is more costly for the family to give an additional year of education to each child.

Parents' educational and occupational background affects the decision of their children to pursue post-secondary education. This is a well-documented fact for the Unites States. For example, Lee et al. (1979) show that the probability to pursue post-secondary education increases with the years of parental education, as well as with family income. Card (1999) provides evidence on the fact that mother's education affects male completion of schooling in general to a weaker extend than father's education.

Table $I.2$ presents the descriptive statistics of the data set used for the empirical analysis. As all family background variables are constructed as dummy variables, the mean of each variable multiplied by 100 equals the percentage of observations with the respective characteristic. It is easy to see that the percentage of individuals whose par-

[4]Including women would mean to account explicitly for the labor participation decision, which requires a different econometric model. For immigrants our educational choice model does not apply. 59 is chosen as the upper bound to account for the fact that most men retire before the full pension retirement age of 65.

In order to prevent the introduction of sample selection bias arising from different response behavior only one observation per individual is included. To avoid the inclusion of individual-specific outliers I use the representative observation of those individuals that participate more than twice in the panel. The representative observation is the observation of an individual with deflated earnings closest to his mean earnings where the mean is calculated over all the individual's observations available for the sample period which fulfill the selection criteria.

ents have a higher education increases with the level of secondary school. Similarly, the percentage of sons of blue-collar workers declines. The positive relation between parental education and post-secondary education remains unchanged. The picture gets less clear when analyzing this relation conditional on the secondary school degree. For example, the percentage of children with mothers or fathers with a Gymnasium degree is lower for men with vocational training than for men without vocational training among Realschule and Gymnasium graduates. Overall a positive relation between parents education and the vocational training choice can be observed in the data. A closer look reveals that is only true for Hauptschule graduates. But as their number is much larger, their positive relation overlays the negative relation between the respective parental background variables and the decision to perform vocational training of Realschule and Gymnasium graduates.

I follow Abraham and Houseman (1993) and Winkelmann (1994) in using deflated monthly earnings as the dependent variable in the earnings equation. The use of monthly earnings is reasonable as measurement errors in hours are high. Average monthly earnings increase with level of secondary school. Is this due to different proportions of individuals with post-secondary education? Or do wages conditional on post-secondary education increase with the secondary school degree?

A first glance at individuals without post-secondary education partially points at a negative answer. Hauptschule graduates without vocational education earn 2907 DM, which is considerably higher than the respective earnings for Realschule (2133 DM) and Gymnasium graduates (2252 DM). However, this finding is not conclusive, as the level of experience of Hauptschule graduates in the sample is significantly higher than that of other graduates. Monthly earnings of individuals with vocational education increase with the level of secondary school, although at the same time the average experience decreases. This suggests that when holding experience constant the difference in monthly earnings among the three types of secondary school conditional on having performed vocational training is even more pronounced.

Summarizing, the descriptive statistics reveal a positive relation between parental education and level of secondary school, as well as post-secondary education. Conditional on the secondary school type, the latter is not generally true. Mean monthly earnings increase with level of secondary education and post-secondary education.

1.5 Results

1.5.1 Secondary School and Post-secondary Education Choice

The positive relation between parental education and level of secondary school is reflected in the estimation results. Table $I.3$ presents these results for two empirical models. The full model assumes that the level of secondary school determines endogenously the choice of post-secondary education. The constrained model imposes exogeneity of secondary school in the post-secondary education equation and hence constrains the correlation coefficients to be equal to zero.

The specification of the secondary school equation is determined by variables available in the GSOEP which affect the secondary school choice. As pointed out in section 4, several variables which are likely to have influenced the secondary school choice, such as ability measures, family income or the marital status of the parents, are not at hand. As a consequence, the estimation has to rely on educational and occupational variables of the parents.

In both models, the coefficients of all variables have the expected positive sign and nearly all are significant. Table $I.3$ reveals that sons of civil servants are very likely to go to a higher secondary school. The same holds for individuals whose father has a university degree. Similarly to other findings mentioned above, the results suggest that mother's education matters less (in the sense of having a lower coefficient) than father's education in determining educational behavior. The full model predicts that increasing the level of secondary education of the father from Hauptschule to Realschule reduces the probability to go to a Hauptschule by 0.2 and raises the probability to go to a Gymnasium by 0.16. Increasing mother's level of education similarly yields a reduction in the probability to go to Hauptschule by 0.06 and increases the probability to go to Gymnasium by 0.05. This confirms the impression derived from the section on descriptive statistics. The relation between parental background variables and level of secondary school is positive. Mother's education affects the probability to go to a higher secondary school to a lower degree than father's education.

Parents' education and labor market status play a less important role in the post-secondary education choice. This seems intuitive since the decision on post-secondary education is taken in the late-teens or early twenties (for graduates from the Gymnasium). Variables, such as the education of the mother, which significantly influence the decision of men do not have any effect when it comes to deciding whether to perform some kind of post-secondary education. Consequently, the set of explanatory variables included in the post-secondary education equation is substantially reduced.

Table $I.4$ presents the results of the post-secondary education equations with endogeneity (full model) and without endogeneity (constrained model) of schooling. As can be seen the correlation coefficient among secondary and post-secondary equation ρ_{sv} is negative for Hauptschule and Gymnasium graduates and positive for Realschule graduates. The estimates reflect this difference. While the coefficients on family background variables decrease in the full model relative to the constrained model for Hauptschule and Gymnasium graduates, they increase for Realschule graduates. The pronounced differences in the correlation coefficients as well as coefficients confirm the switching model approach.

The constrained model predicts that a Hauptschule graduate is most likely to perform vocational training if his father is civil servant or has a Realschule degree. Sons of civil servants and university graduates are most likely to go to university. The full model reveals a completely different picture. It predicts that the probability of an Hauptschule graduate to complete vocational training or of a Gymnasium graduate to acquire a university degree is highest for sons of blue-collar workers. These probabilities are also very high for children whose father has a Hauptschule degree.

The fact that ρ_{sv} is significant, reveals that endogeneity matters. In Germany it is reasonable to expect that unobservables influencing secondary and post-secondary education choice are unlikely to be orthogonal. This arises from the fact that in order to reach a specific occupation individuals usually have to complete secondary school and to pursue some post-secondary educational degree. Access to this in turn often requires a certain secondary school degree. Hence, individuals are likely to choose their highest secondary school degree and their post-secondary education simultaneously.

Interpretation of the signs of the correlation coefficient would be straightforward in a model which switches into a linear regression. A negative correlation coefficient means that if an individual with a low educational family background chooses to go to a higher secondary school, then his probability to continue with university would be underpredicted if selection is not accounted for. This underprediction arises from the fact that students who choose to go to a higher secondary school although their educational family background is weak, have a higher ability than the average population. Hence, their probability to go to university should be above average. Of course this only holds if - given that the educational background of the parents is positively correlated with family income - financing university education imposes no major constraints to children from low income families.

Similarly, think of a child from a highly educated family which chooses to go to a secondary school which is lower than what would have been the prediction based on his family background. If the child chooses to go to a lower secondary school than his family background suggests, that his ability (or taste for studying) may be lower than average and hence his probability to perform vocational training as well.

The expected probabilities of accomplishing vocational training or university conditional on the chosen type of secondary school, as well as the respective unconditional probabilities can be looked up in table $I.5$. The conditional probabilities of performing vocational training are calculated by using $\sum_{i=1}^{N_k} P_i(V_j = 1|k)$ where k and j are Hauptschule, Realschule or Gymnasium. The diagonal elements of the conditional probabilities provide evidence of the probability to perform vocational education (and to go to university for Gymnasium graduates) conditional on having chosen the respective secondary degree and hence they are calculated for j equal to k. The off-diagonal elements are the unobserved counter-factuals with j different from k.

In the constrained model the conditional probabilities reduce to
$\sum_{i=1}^{N_k} P_i(V_j = 1)$. The difference between the two models is striking. While the probability to go to university decreases with the level of secondary school in the full model, it increases in the constrained model. Similarly, the probability to perform vocational training in Hauptschule decreases when conditioning on a higher level of secondary school in the full model but increases in the constrained model.

The counter-factuals are the probability of an arbitrary student with a certain secondary school degree to perform post-secondary education if he would have gone to a different type of secondary school. For example, 0.997 is the probability of an arbitrary Hauptschule student to go to university if he would have gone to a Gymnasium. Or put differently, 0.997 is the probability that someone, who in accordance with his family background would have been expected to go to Hauptschule and actual went to a Gymnasium obtains a university degree. Thus, the full model tells us that if a predicted Hauptschule student actually goes to a Gymnasium then his probability to go to university is substantially higher than that of a predicted Gymnasium graduate. Accounting for endogeneity thus reveals that the probability to go to university is above average for those who actually choose to go to a Gymnasium. Accordingly, the probability to participate in vocational training is below average for those who decide to go Hauptschule. This is consistent with the interpretation of the signs of ρ_{sv} in a conventual switching model as stated above.

Summarizing, the correlation among the educational background variables of the parents and the secondary school choice is positive. Family background plays a less important role for post-secondary education decision. The relation between family background and post-secondary choice differs among graduates from different secondary schools.

The correlation coefficient among secondary school and post-secondary education equation is significant for graduates from all three types of secondary school. Not accounting for selection yields biased estimates. The probability to perform vocational training for Hauptschule graduates who actually choose to go to Hauptschule would be overpredicted and the decision to go to university would be underpredicted for Gymnasium graduates. Accounting for endogeneity reveals that an individual whose father has no vocational degree is less likely to go to a Gymnasium than an individual whose father has a university degree. But if he went to a Gymnasium then his probability of attaining university is higher than the probability of the latter.

1.5.2 Returns to Education and Earnings Differentials

The basic specification of the earnings equation consists of the regression of the log of deflated average monthly earnings on educational dummies, experience and marital status. This simple form allows to compare my results with those of previous research. In what follows I will first present the OLS estimates, then analyze maximum likelihood estimates and finally discuss the earnings differentials.

Table $I.6$ presents the results of various OLS regressions. In the left column of the table, the estimates of the basic specification for the entire sample can be encountered. They suggest that a Realschule degree raises earnings by around 14 percent and a Gymnasium degree by 0.09 percent. German men without post-secondary education earn 22 percent less than their counterparts with a vocational education degree and 57 percent less compared to the holder of an academic degree. All values are significant, have the expected signs and are within the range of the values presented by Abraham and Houseman (1993) and Winkelmann (1994), who perform OLS cross-section estimations for Germany based on the GSOEP.

As exposed in sections $I.2$ and $I.5.1$ graduates from different types of secondary school differ in the knowledge they receive during secondary school, the kind of post-secondary

education they choose and their probability to continue with post-secondary education. This points at the existence of heterogeneity in the returns to post-secondary education. Separate regressions for each secondary school group reveal that imposing equal returns to vocational training among the three secondary school groups overestimates the returns to vocational training for Hauptschule and understates returns to vocational training for Realschule and Gymnasium graduates. Returns to university are underestimated. These new results indicate that vocational training raises monthly earnings of Hauptschule and Realschule graduates on average by 16 to 27%, ceteris paribus. Moreover, monthly earnings of Gymnasium increase on average 43%. Annual returns of vocational training thus amount to 5.2%, 9.1% and 21.3% for Hauptschule, Realschule and Gymnasium graduates. A university degree raises earnings by nearly 70% which corresponds to an annual return to university of about 14% which is significantly lower than annual returns to vocational training. However, it is very likely that the true returns to vocational training are not as high as our estimates suggest due to the fact that participants of a vocational training program gain actual labor market experience during its completion, which is not necessarily the case for university graduates.[5]

Family background variables often have been used in order to control directly for unobserved ability or as instrumental variables for the level of education. Card (1999) shows that given that there are no measurement errors in family background variables, the upward bias in the OLS estimates will decrease as family background variables are included. (The bias of OLS with family background variables is even lower than the bias of the instrumental variable estimators). I find that the inclusion of family background variables in the earnings equation has no strong impact on the estimates of returns to education. The direction of the bias in the OLS estimates is ambiguous. This may arise from the fact that in Germany the post-secondary education choice conditional on the type of secondary school is not necessarily positively correlated with family background (see section $I.5.1$).

For Germany it has been claimed that better educated individuals are more likely to work in industries which pay higher salaries. This hints at an upward bias of the OLS estimates when neither occupation nor industry controls are included in the specification. In accordance with previous findings (see, for example, Winkelmann, 1994), the inclusion of firm size dummies in the regression of the entire sample reduces returns to education slightly. The separate regressions for each secondary school type reveal a slightly different picture. Firm-size dummies are largely significant for Hauptschule graduates, but mostly insignificant for Realschule and Gymnasium graduates. The firm size dummies are not even jointly significant for these groups. The values of the 95 and 99 percentile of the $F(4, \infty)$ are 2.37 and 3.34 respectively which compare to observed F-statistics of 1.2 for Realschule graduates and 2.8 for Gymnasium graduates. This finding may be explained by the fact that the percentage of graduates from Hauptschule is highest in such different vocational fields such as craft, domestic science or industry, while graduates from the Gymnasium usually choose areas such as civil service, banking and commerce.

[5]The completion of a vocational training program generally takes three years for Hauptschule and Realschule graduates and two years for graduates from a Gymnasium. To calculate annual returns to university (including technical colleges), I assume that it takes five years to accomplish a university degree.

Table I.1. Summary of Returns to Education

	Full Model	$\rho_{sw}=0$	$\rho_{vw}=0$	$\rho_{sw}=\rho_{sv}=0$	$\rho_{vw}=\rho_{sv}=0$	**OLS**
Hauptschule						
Vocational	0.130	0.140	0.156	0.130	0.157**	0.157**
ρ_{sw}	-0.001	-	0.005	-	-0.032	-
ρ_{vw}	0.034	0.026	-	0.050	-	-
ρ_{sv}	-0.864***	-0.864**	-0.708**	-	-	-
Realschule						
Vocational	0.771**	0.769**	0.269**	0.752**	0.274**	0.273**
ρ_{sw}	-0.066	-	-0.033	-	-0.034	-
ρ_{vw}	-0.527*	-0.611*	-	-0.696**	-	-
ρ_{sv}	0.763**	0.742	0.264	-	-	-
Gymnasium						
Vocational	0.697**	0.389**	0.431**	0.378**	0.425**	0.425**
University	1.445**	0.587	0.685**	0.563**	0.672**	0.670**
ρ_{sw}	0.00	-	0.058	-	0.054*	-
ρ	-0.506**	0.081	-	0.107	-	-
ρ_{sv}	-0.842	-0.843	0.309	-	-	-
Log Likelihood	-1.631	-1.632	-1.634	-1.633	-1.634	-1.634

Vocational refers to a dummy for vocation training. Full Model imposes no constraints on ρ_{sv}, ρ_{sw} and ρ_{vw}. ρ_{sv}, ρ_{sw} and ρ_{vw} are the correlation coefficients between secondary school/ post-secondary Equation, secondary education/wage equation and post- secondary education/wage equation, respectively. Number of observations: 1702 for all models. ** Significant at 5 percent level. ** Significant at 10 percent level.

Table $I.1$ presents a summary of the maximum likelihood estimates of the returns to post-secondary education which account for endogeneity and selection.[6]

The results of the model clearly show that OLS estimates are biased. The direction of the bias however is ambiguous. OLS biases returns to vocational training upwards for Hauptschule graduates but downwards for Realschule and Gymnasium graduates. As a consequence the differences in returns increase substantially. Returns to a vocational training degree are more than five times higher for Gymnasium graduates than for Hauptschule graduates. Differences in annual returns are even larger. One year of vocational training increases earnings of Hauptschule, Realschule and Gymnasium graduates by 0.04%, 0.26% and 0.35% respectively.

The difference in the university dummy between OLS and the full model is striking. It is the result of the two large negative correlation coefficients ρ_{sv} and ρ_{vw}.The correlation coefficient among educational equations and earnings equation may be significantly negative according to human capital theory as lower-wage individuals will be more likely to invest in schooling than higher wage individuals, holding other things equal. This arises from the fact that foregone earnings are higher for the second group. As Blackburn and Neumark (1995) point out, a negative correlation between education and earnings equa-

[6]The complete estimation results can be found in table 6.

tion residuals or put differently a downward bias in the OLS estimates may continue to exist even if ability is not controlled for, if higher-ability individuals face higher costs in terms of foregone earnings costs at the margin. In table $I.1$. it can be seen in the model on the right with ρ_{vw}=ρ_{sv}=0, that the correlation coefficient between secondary school and earnings equation ρ_{sw} is insignificant at the 10% level for all the groups. This may point out that secondary school choice and future income are not determined simultaneously which is not surprising as the former generally is made at the age of 10.

Contrary to this, ρ_{vw} (the correlation coefficient between post-secondary education and earnings equation) is significant for Realschule and Gymnasium graduates. This finding may be the result of selection or due to measurement error in the educational attainment variables. The latter may lead to a correlation between the measured post-secondary education degree and the earnings equation. However, the fact that post-secondary education degrees and not years of education are used in this estimation suggests that measurement errors due to misreporting do not play an important role.

Post-secondary education enters the earnings equation in the form of an endogenous dummy. As explained in section 3 the endogenous dummy model implicitly imposes that all coefficients except the constant are the same among the types with different post-secondary education choices but the same secondary school degree. This assumption can be loosened by including interaction terms in the earnings equation. Besides the estimates of the basic specification, estimates with interaction terms are used to calculate earnings differential, as they allow for interesting insights.

Evidence on the predicted earnings differentials under random assignment is presented in table$I.7$. Given the assumption that an individual could be randomly assigned to two different secondary schools, these earnings differentials explain the respective percentage differences in earnings. They ignore selection. OLS estimates, for example, suggest that a married man with 15 years of experience and a vocational training degree earns 39% more if he obtained a Gymnasium instead of a Hauptschule degree. Earnings differentials based on OLS estimates are throughout positive, increase with years of experience and are largest between Gymnasium and Hauptschule. Differences in earnings for individuals without a vocational training degree are very low, and the other three models reveal even negative earnings differentials. This may hint at the fact that individuals which have a higher secondary school degree, but do not continue with post-secondary education exhibit a bad signal.

Unconditional and conditional predicted earnings, which consider selection in the two full models, can be looked up in table $I.8$. The unconditional earnings is the mean earnings prior to the secondary school choice, that is $E(w_j)$ with j = Hauptschule, Realschule or Gymnasium. Or put differently, it is the average predicted value of the monthly earnings (for Hauptschule, Realschule and Gymnasium graduates) taken over all individuals in the sample. Unconditional earnings predictions are higher in the models where selection is not accounted for. But what is more striking is the fact that the models with interaction terms predict unconditional earnings for Gymnasium graduates which are twice as high as the prediction of their respective counterparts without interaction terms. This may arise from the fact that heterogeneity still plays a role among Gymnasium graduates because Gymnasium graduates face the additional choice of going to university.

The conditional earnings is the mean earnings conditional on the secondary school

choice. The diagonal elements in the first part of table $I.8.$ provide information on $E(w_j|S = k)$ for $k = j$. Again j refers to Hauptschule, Realschule or Gymnasium. For example, 3238.13 DM is the average earnings of Hauptschule graduates who actually choose to go to Hauptschule. These elements are rather similar among the models. The major difference lies in the fact that the models with interaction terms predict significantly higher conditional earnings for Gymnasium graduates. While the models without interaction terms predict earnings differentials of approximately 30%, these differentials amount to 50% when interaction terms are included. Comparing conditional earnings with unconditional earnings, it can be seen, that conditional earnings are always higher for Hauptschule graduates and lower for Realschule graduates. As for Gymnasium graduates this again depends on the type of model: unconditional earnings are higher in the models with interaction terms but lower in the models without them.

The off-diagonal elements in this part of the table shed light on $E(w_j|S = k)$ for $k \neq j$, the so called counter-factuals. For example, 3025.73 DM corresponds to $E(w_R|S = H)$ which is the expected potential earnings of a Hauptschule graduate would he have chosen to go to Realschule. Conditional on a certain type of secondary school earnings increase from the left to the right. This means that a certain secondary school graduate would have earned less if he would have chosen a lower type of secondary school degree, but more if he would have chosen a higher type secondary school degree. Moreover, all models suggest that the expected earnings of a Hauptschule graduate who actually choose to go to a Gymnasium is higher than the conditional earnings of a Gymnasium graduate. The percentage differences among counter-factuals and the respective conditional earnings are much more pronounced when selection is taken into consideration. The two full models state that conditional earnings of a Hauptschule student is about 27% higher than the earnings of a predicted Gymnasium graduate who chooses to go to Hauptschule. The same earnings differential amounts to only 20% in the constrained models. Similarly, the difference in earnings between a Gymnasium and a predicted Hauptschule graduate with a Gymnasium degree is only 6% in the constrained model, but 50% (16%) in the full model (with interaction terms). These results are in line with the findings in section 5.1 that the probability to go to university is above average for Hauptschule graduates who actually choose to go to a Gymnasium and below average for the Gymnasium graduates who decide to go Hauptschule if endogeneity is accounted for.

Earnings differentials in percentage between observed sample earnings and counter-factuals, as well as conditional earnings and counter-factuals can be found in table $I.9.$ Earnings differentials are often called gross benefit of participating in a program which is here, completing a certain type of secondary school. It is usually used to evaluate the success of a program. These earnings differentials (and hence the benefit to go to a Gymnasium) are nearly throughout positive for Gymnasium graduates. For Hauptschule graduates the contrary is the case. According to nearly all models, they would have been better off on average by choosing another type of school. And what is more, even expected earnings differentials reveal the same signs. Hence, this may be an explanation for increasing (decreasing) enrollments rates in Gymnasium (Hauptschule). Furthermore, it can be observed that not accounting for endogeneity underpredicts the earnings gains of going to a Gymnasium for those who went and the losses of those who did not complete a Gymnasium degree.

Do the negative earnings differentials for Hauptschule and Realschule graduates indicate that they are not rational? The negative earnings differential may be the result of the peculiarity of the German education system, that individuals are selected into the three different types of secondary schools at the age of ten. Mobility among these schools increased largely during the 80's, but was not very common before and hence does not apply to most of the individuals in my sample. The rigidity of the system may have resulted in misallocations and prevented the agents of making optimal decisions. Moreover, unemployment rates affect the three secondary school groups differently. During the 80's unemployment rates of Hauptschule students increased twice as much as those of students from the Realschule or Gymnasium. And individuals without vocational qualification faced the highest growth in unemployed compared to those with post-secondary education degrees. Unemployment rates among university graduates increased. This suggests that the characteristics of those in work and out of work differ. Accounting for differences in unemployment rates may reveal a different picture.

The estimation results presented above clearly show that OLS estimates are biased. The direction of the bias however is ambiguous. OLS biases returns to vocational training upwards for Hauptschule graduates but downwards for Realschule and Gymnasium graduates. One year of vocational training increases monthly earnings of Hauptschule, Realschule and Gymnasium graduates by 4%, 16% and 33%, respectively. Accounting for endogeneity and selection thus, reveals that annual returns to vocational training are eight times higher for Gymnasium graduates than for Hauptschule graduates and that returns to vocational training differ to a much larger extend among the three types of secondary school than OLS estimates suggest.

1.6 Conclusion

In the previous sections I present a simultaneous equation model with endogenous dummy variables and switching which captures the basic features of the German education system. Using this model I estimate average returns to post-secondary education in Germany and calculate earnings differentials among the different types of secondary school. Moreover, I analyze differences in post-secondary choice behavior, address the question whether selection into post-secondary education matters and whether post-secondary education should be treated endogenously.

I find that the relation between parents' education level and the probability to go to a higher secondary school is throughout positive. The relation between parents education and post-secondary education choices is much weaker and not unambiguous. The correlation coefficient between secondary school and post-secondary education equation is significantly different from zero for all three groups. As a consequence, not accounting for selection, underpredicts the probability to go to university for a Gymnasium graduate and overpredicts probability of a Hauptschule student to perform vocational training.

The results reveal that the three secondary school groups differ not only in their post-secondary education choices, but also in their returns to vocational training. When selection into the type of secondary school is considered and endogeneity of post-secondary education in the earnings equation is allowed for, annual returns to vocational training are eight times higher for Gymnasium graduates the for Hauptschule graduates. Not

surprisingly, annual returns to vocational training increase with the level of secondary school.

Endogeneity of secondary school and post-secondary education matter. This implies that OLS estimates are biased. However, the direction of the bias is not unidirectional. Concerning returns to vocational training, OLS overstates returns for Hauptschule graduates by about 20 % but understates returns for Gymnasium graduates by 60 %. Returns to university are more than twice as high as OLS suggests.

The model presented in this study can be extended in three directions: The first one is to account for the high complexity of the Germany education system and to expand the set of post-secondary education choices. The second points towards including additional endogenous variables such as experience and hours. Third, unemployment should be considered. It affects the three secondary school groups to a different extent. During the 80's unemployment rates of Hauptschule students increased twice as much as those of students from the Realschule or Gymnasium. And individuals without vocational qualification faced the highest growth in unemployed compared to those with post-secondary education degrees. This suggests that the characteristics of those in work and out of work differ. Controlling for this potential "composition bias" may provide fruitful insights in the "real" differences of returns to education in Germany.

Tables

Table I.2. Descriptive Statistics

	Total	**Haupt-schule**	No Voc	Voc	**Real-schule**	No Voc	Voc
#observations	1702	971	135	836	346	25	321
Means							
Earnings	3741.1	3386.9	2907.2	3464.4	3642.3	2133.0	3759.9
Experience	1.888	2.193	2.325	2.171	1.536	0.792	1.594
Married	0.634	0.670	0.615	0.679	0.546	0.120	0.579
Mother Realschule	0.101	0.039	0.037	0.039	0.116	0.000	0.125
Mother Gymnasium	0.024	0.004	0.000	0.005	0.014	0.040	0.012
Mother Post-sec. Edu	0.444	0.341	0.230	0.359	0.566	0.760	0.551
Father Realschule	0.108	0.051	0.022	0.056	0.156	0.160	0.156
Father Gymnasium	0.079	0.016	0.007	0.018	0.061	0.080	0.059
Father Vocational	0.766	0.780	0.689	0.794	0.798	0.840	0.794
Father University	0.073	0.009	0.007	0.010	0.064	0.080	0.062
Father Independent	0.161	0.154	0.170	0.152	0.162	0.160	0.162
Father White-collar	0.175	0.100	0.067	0.105	0.240	0.240	0.240
Father Civil Servant	0.129	0.072	0.037	0.078	0.118	0.200	0.112
Standard Deviations							
Earnings	1747.02	1168.19	995.52	1176.03	1543.47	819.35	1525.20
Experience	1.181	1.193	1.366	1.162	1.091	0.789	1.090

Code see Table 1. No Voc = no vocational training degree. Voc = vocational training degree. Uni = university. Independent refers to independent worker.

Table I.2 (continued). Descriptive Statistics

	Gym–nasium	No Voc	Voc	Uni
#observations	385	37	103	245
Means				
Earnings	4723.2	2252.5	3875.6	5452.7
Experience	1.438	0.746	1.435	1.543
Married	0.621	0.216	0.544	0.714
Mother Realschule	0.244	0.270	0.243	0.241
Mother Gymnasium	0.083	0.108	0.049	0.094
Mother Post-sec. Edu	0.592	0.568	0.641	0.576
Father Realschule	0.205	0.189	0.165	0.224
Father Gymnasium	0.255	0.297	0.252	0.249
Father Vocational	0.701	0.676	0.680	0.714
Father University	0.242	0.216	0.233	0.249
Father Independent	0.177	0.189	0.146	0.188
Father White-collar	0.304	0.351	0.330	0.286
Father Civil Servant	0.283	0.216	0.214	0.322
Standard Deviations				
Earnings	2576.66	1870.53	1854.74	2594.41
Experience	0.980	0.469	1.055	0.965

Code see Table 1. No Voc = no vocational training degree. Voc = vocational training degree. Uni = university. Independent refers to independent worker.

Table I.3. Secondary School Equation

	Full Model		**Constrained Model**	
	Coefficient	Standard Error	Coefficient	Standard Error
Constant	-0.838**	0.085	-0.848**	0.084
Mother Realschule	0.161**	0.093	0.397**	0.115
Mother Gymnasium	0.575**	0.227	0.639**	0.238
Mother Post-secondary Education	0.207**	0.060	0.232**	0.067
Father Realschule	0.509**	0.107	0.442**	0.110
Father Gymnasium	0.684**	0.195	0.574**	0.217
Father Vocational Training	0.188**	0.093	0.178**	0.092
Father University	0.823**	0.227	0.814**	0.245
Father Independent Worker	0.310**	0.090	0.308**	0.090
Father White Collar	0.606**	0.090	0.581	0.090
Father Civil Servant	0.651**	0.102	0.664**	0.101
Threshold School c_s	0.702**	0.034	0.707**	0.034
Log Likelihood	-1.6314		-1.6344	
#observations	1702		1702	

Full Model imposes no constraints on ρ_{sv}, ρ_{sw} and ρ_{vw}. Constrained Model imposes that $\rho_{sv} = \rho_{sw} = \rho_{vw} = 0$. ρ_{sv}, ρ_{sw} and ρ_{vw} are the correlation coefficients between secondary school and post-secondary education equation,secondary school and wage equation and post- secondaryeducation and wage equation, respectively. * Significant at 5 percent level.

Table I.4. Post-secondary Education Equation

	Full Model		**Constrained Model**	
	Coefficient	SE	Coefficient	SE
Hauptschule				
Constant	0.405**	0.127	0.833**	0.106
Father Realschule	-0.160	0.275	0.384	0.303
Father Gymnasium	-0.180	1.042	0.526	1.256
Father Vocational Training	0.038	0.131	0.263**	0.120
Father University	-0.954	0.979	-0.299	1.198
Father Independent Worker	-0.188	0.121	-0.005	0.140
Father White Collar Worker	-0.289	0.202	0.185	0.195
Father Civil Servant	-0.212	0.255	0.336	0.266
ρ_{sv}	-0.864**	0.156	-	-
Realschule				
Constant	0.311	0.931	1.760**	0.357
Father Realschule	0.434	0.355	0.128	0.535
Father Gymnasium	0.554	0.708	-0.005	1.661
Father Vocational Training	0.025	0.362	-0.256	0.362
Father University	0.188	0.951	-0.268	1.701
Father Independent Worker	0.173	0.228	-0.092	0.323
Father White Collar Worker	0.572**	0.268	-0.084	0.281
Father Civil Servant	0.299	0.452	-0.388	0.499
ρ_{sv}	0.763	0.279	-	-
Gymnasium				
Constant	2.348***	0.151	0.729**	0.273
Father Realschule	-0.216*	0.131	0.036	0.183
Father Gymnasium	-0.423**	0.173	-0.358	0.229
Father Vocational Training	0.032	0.132	0.506*	0.270
Father University	-0.202	0.238	0.717**	0.351
Father Independent Worker	-0.296**	0.131	0.232	0.206
Father White Collar	-0.495**	0.116	0.033	0.194
Father Civil Servant	-0.391**	0.137	0.400**	0.201
Threshold university c_G	0.738**	0.077	0.978**	0.089
ρ_{sv}	-0.842**	0.063	-	-
Log Likelihood	-1.6314		-1.6344	
#observations	1702		1702	

Table I.5. Probabilities to Pursue Post-Secondary Education

	Hauptschule	**Realschule**	**Gymnasium**	
	Vocational Training	Vocational Training	Vocational Training	University
conditional on				
Full Model				
Hauptschule	0.861	0.529	0.003	0.997
Realschule	0.391	0.922	0.049	0.949
Gymnasium	0.090	0.986	0.268	0.634
Constrained Model				
Hauptschule	0.861	0.933	0.293	0.583
Realschule	0.877	0.928	0.282	0.606
Gymnasium	0.896	0.914	0.267	0.637
unconditional				
Full Model	0.590	0.712	0.072	0.905
Constrained Model	0.872	0.928	0.285	0.600

0.003 e.g. is $\sum_H P_i(V_{Gymnasium} = 1|H)/N_H$. H refers to Hauptschule.
N_H is the number of Hauptschule graduates.

Table I.6. OLS Earnings Equations

	All		**Hauptschule**		**Realschule**		**Gymnasium**	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Constant	7.152**	0.036	7.429**	0.042	7.145**	0.073	6.833**	0.087
Realschule	0.139**	0.023						
Gymnasium	0.091**	0.033						
Vocational Training	0.217**	0.028	0.157**	0.029	0.273**	0.069	0.426**	0.085
University	0.570**	0.043					0.670**	0.081
Experience	0.612**	0.035	0.377**	0.042	0.754**	0.072	0.969**	0.098
Experience^2	-0.113**	0.008	-0.066**	0.009	-0.139**	0.017	-0.201**	0.025
Married	0.134**	0.023	0.136**	0.028	0.077*	0.045	0.208**	0.057
R^2	0.434		0.267		0.513		0.554	

Dependent variable: log monthly earnings. SE refers to standard error.

** Significant at 5 percent level. * Significant at 10 percent level.

Table I.7. Predicted Earnings under Random Assignment

	Full Model	Full Model Interaction	OLS	OLS Interaction
Vocational Training, experience 15, married				
Realschule/Hauptschule	24.39	24.27	19.04	18.38
Gymnasium/Hauptschule	2.94	35.56	38.99	43.87
Gymnasium/Realschule	-17.24	9.17	16.77	21.53
Vocational Training, experience 15, not married				
Realschule/Hauptschule	34.18	32.91	26.27	24.70
Gymnasium/Hauptschule	-5.26	28.18	29.34	35.63
Gymnasium/Realschule	-29.34	-3.56	2.43	8.76
No Vocational Training, experience 15, married				
Realschule/Hauptschule	-34.48	-15.04	6.00	40.11
Gymnasium/Hauptschule	-41.61	-12.91	6.21	-4.09
Gymnasium/Realschule	-10.99	2.51	0.20	-31.55
Vocational Training, experience 10, married				
Realschule/Hauptschule	12.30	13.09	8.00	8.00
Gymnasium/Hauptschule	-8.24	14.80	22.38	20.92
Gymnasium/Realschule	-18.29	1.51	13.31	11.96
Vocational Training, experience 20, married				
Realschule/Hauptschule	32.71	31.92	26.19	25.61
Gymnasium/Hauptschule	8.44	47.99	47.65	58.88
Gymnasium/Realschule	-18.29	12.99	16.66	26.49

In percent. Interaction refers to an extension of the basic specification, including interacation terms of post- secondary education dummies and experience, as well as experience squared.

Table I.8. Predicted Earnings

	Wage			**Unconditional**
	Hauptschule	Realschule	Gymnasium	**Wage**
conditional on				
Full Model				
Hauptschule	3238.13	3015.73	6360.42	3092.81
Realschule	2807.23	3387.45	5550.53	3445.45
Gymnasium	2522.86	3426.38	4219.66	3241.39
Full Model with Interaction Terms				
Hauptschule	3236.96	3709.33	5852.12	3082.21
Realschule	2843.25	3419.77	4230.62	3552.82
Gymnasium	2555.23	4884.85	5035.79	6641.38
Constrained Model				
Hauptschule	3236.88	3901.65	4475.74	3086.05
Realschule	2993.03	3462.24	4081.22	3565.82
Gymnasium	2689.84	3470.43	4248.33	3959.81
Constrained Model with Interaction Terms				
Hauptschule	3230.47	3973.27	5271.38	3076.11
Realschule	2990.11	3517.76	4386.60	3759.23
Gymnasium	2687.21	4949.87	4935.27	7329.85

Conditional wage is $E(w_j|S = k)$ with j corresponding to the vertical and k to the horizontal references. Unconditional wage is $E(w_j)$ taken over all individuals in the sample. j and k take the values Hauptschule, Realschule or Gymnasium. Earnings are expressed in US dollars.

Table I.9. Earnings Differentials

	wage differential			expected wage differential		
	w_H	w_R	w_G	$E(w_H\|H)$	$E(w_R\|R)$	$Ew_G\|G)$
Full Model						
- $E(w_R\|H)$	10.96			6.87		
- $E(w_G\|H)$	-87.79			-96.42		
- $E(w_H\|R)$		22.93			17.13	
- $E(w_G\|R)$		-52.39			-63.86	
- $E(w_H\|G)$			42.47			35.61
- $E(w_R\|G)$			27.46			18.80
Full Model with Interaction Terms						
- $E(w_R\|H)$	-9.52			-14.59		
- $E(w_G\|H)$	-72.78			-80.79		
- $E(w_H\|R)$		21.94			16.86	
- $E(w_G\|R)$		-16.15			-23.71	
- $E(w_H\|G)$			42.32			45.90
- $E(w_R\|G)$			-3.42			3.00
Constrained Model						
- $E(w_R\|H)$	-15.20			-20.54		
- $E(w_G\|H)$	-32.15			-38.27		
- $E(w_H\|R)$		17.83			13.55	
- $E(w_G\|R)$		-12.05			-17.88	
- $E(w_H\|G)$			35.69			28.80
- $E(w_R\|G)$			26.52			18.31
Constrained Model with Interaction Term						
- $E(w_R\|H)$	-17.31			-22.99		
- $E(w_G\|H)$	-55.64			-63.18		
- $E(w_H\|R)$		17.91			15.00	
- $E(w_G\|R)$		-20.43			-24.70	
- $E(w_H\|G)$			36.36			39.10
- $E(w_R\|G)$			-4.80			-0.30

w refers to wage and subindices H,R and G to Hauptschule, Realschule and Gymnasium respectively. w refers to the actual wages received. In percent.

Appendix

German Post-secondary Education System

Figure 1 abstracts from the fact that special schools exist which offer graduates from Hauptschule or Realschule the opportunity to accomplish the respective subsequent secondary school degree. Furthermore, Realschule graduates to attain technical colleges (see below). However, only few individuals in my sample take these options.

Vocational training can be accomplished through different types of training but its heart is the apprenticeship. In order to perform an apprenticeship students apply to firms or master craftsmen. They receive earnings which increase with each year of the apprenticeship but remain considerably below post-apprenticeship earnings. Completion of an apprenticeship takes two or three years depending on the secondary school degree.

Apprenticeship is also called the dual system as it combines training-on-the-job and class-room schooling. It is offered for a large variety of economic sectors, for blue-collar as well as white-collar jobs. For each profession which is allowed to offer an apprenticeship state regulations exist. Oral, written and practical exams are set at the federal level and conducted by the industry chambers. The cost of apprenticeships is shared by the firms, the state and the federal government. Training centers, for companies which do not have their own classroom training, are jointly funded by local chambers of commerce and industry and the Federal Ministry of Education and Science.

Specialized vocational schools provide a further range of post-secondary vocational training choices. There exist part-time and full-time vocational schools on a lower level, which allow to receive a general preparation for an occupation (Berufsschulen or vocational schools), as well as specialized vocational schools (Fachschulen or Trade and Technical schools), health schools or schools for public administration on a higher level. Latter are attended usually after several years of work experience. All programs last between one and two years.

Academic education can be pursued in universities or technical colleges (Fachhochschulen). Technical colleges provide an applied professional formation for professions which require the application of scientific knowledge and methods. Studies are offered in fields such as engineering, economics, social studies, agriculture and design.

GSOEP

The German 95% Sample of the Socioeconomic Panel (GSOEP) is a longitudinal survey of private households and persons. Initiated in 1984 in the Federal Republic of Germany (FRG), it was expanded to the territory of the German Democratic Republic in June 1990. The sample population consists of the population that lives and receives their income in Germany independent of their nationality. 12245 persons above 16 years in 5921 households were included in the first wave (annual survey). This number decreased to 8467 persons (ca.70%) in 4389 households in 1997 for the West-SOEP.

The participation in the SOEP is voluntary. Consequently, in contrast to social security records the sample is not capped and information about incomes above the respective annual social security earnings cap is available. Furthermore, records of individuals are not linked with records of spouses. Disadvantages of voluntary participation are that the number of non-responses or implausible values is high and that monthly earnings are often

rounded off to 100 or 1000 DM. Additionally, voluntary participation leads to a bias in favor of the middle class.

Annual Individual Labor Earnings

As the German tax and transfer system makes it extremely difficult to control for all the factors that determine the post-government income at the individual level, post-tax labor earnings are used here. According to the GSOEP methodology labor earnings include earnings and salary from all employment including training, primary and secondary jobs, and self-employment, plus income from bonuses such as 13th month pay, 14th month pay, Christmas bonus pay, holiday bonus pay, miscellaneous bonus pay, overtime, and profit-sharing. Monthly earnings then are calculated by dividing annual earnings by twelve.

2 Trade and Human Capital Accumulation - Evidence from US Immigrants

2.1 Introduction

Theory identifies the effect of trade on on-the-job human capital accumulation as an important channel through which trade may enhance economic growth. But whether trade increases or decreases on-the-job human capital accumulation is ambiguous from a theoretical point of view. Trade may foster the acquisition of human capital by facilitating the transfer of ideas and technology from technologically more advanced countries to less advanced economies. Technology transfer affects human capital accumulation through two channels. First, implementing and working with a new technology increases the knowledge of workers. On-the-job learning is hence a by-product of trade. Second, trade may lead to an increase in wages of skilled relative to unskilled workers inducing workers to invest more in human capital (e.g. Hall and Jones (1999), Pissarides (1997) and Goh and Olivier (2002)).

Opening up to trade may also theoretically reduce on-the-job human capital accumulation. If some productive activities carry a higher rate of skill acquisition than others, moving from autarchy to free trade may depress learning-by-doing. This happens if trade induces countries to import high-quality goods rather than to produce them (Stokey (1991) and Young (1991)).[7]

Approaching the question whether trade increases of decreases on-the-job human capital accumulation empirically requires a measure of on-the-job accumulation of human capital, such as the return to experience. Cross-country data on returns to experience is not well suited to estimate the effect of trade on human capital accumulation since the return to experience is determined by the price of on-the-job human capital, as well as its quantity and quality. The identification of cross-country differences in human capital accumulation requires to hold this price constant across countries. But the price of on-the-job human capital is a function of country-specific variables such as technology, supply of human capital, labor market institutions and governmental quality.

If all these country-specific variables were constant across time, panel data would be a solution to this problem. But panel data on cross-country returns to experience is generally not available. Moreover panel data could not solve another fundamental problem. Opening up to trade does not only change commodity prices, it also affects relative factor prices and hence the price of human capital.[8] As a consequence, observing higher returns to experience in more open economies does not allow to conclude that trade increases on-the-job human capital accumulation.

These problems are likely to explain why there exist very few empirical studies about cross-country differences in on-the-job human capital accumulation. The empirical strategy pursued in this chapter overcomes these issues as it does not rely on cross-country data. Instead, it uses data on US immigrants from different source countries to estimate

[7] Routine or traditional production techniques, for example, are likely to be associated with less learning than more complex, technology-intensive tasks (Lucas (1988, 1993)).

[8] According to the Stolper-Samuelson theorem the relative reward of a factor that is more intensively used in the production of a good increases as the price of the good rises.

US returns to home country experience. These returns are measured within the same labor market and are therefore not affected by cross-country differences in the price of on-the-job human capital. Furthermore, the US labor market is characterized by a relatively low level of labor market regulation which assures that wages and hence estimated returns to experience are related to productivity.

I provide evidence of a positive and significant effect of home country trade on returns to home country experience of US immigrants, indicating that trade enhances the accumulation of on-the-job human capital. High investment rates per worker, which can be considered a precondition for technology adoption, and strong governments and institutions have a positive and significant effect on returns to home country experience. The positive effect of trade on returns to home country experience persists when restricting the sample to developing countries, providing empirical evidence for the hypothesis that trade increases learning-by-doing through technology transfer even in less developed countries. It is robust to the issues of self-selection, heterogeneity in returns to experience and English speaking origin and is unlikely to be the result of unobserved cultural background.

The remaining part of this chapter is organized as follows. The next section provides a short summary of the related literature. Section 3summarizes the empirical strategy. Section 4discusses data and provides a preliminary data analysis. The main results are presented and discussed in section 5. Section 6performs a series of robustness checks. The final section concludes.

2.2 Related Literature

Human capital accumulation on the job, either through learning by doing or formal training does not come for free. Individuals have to invest time, effort and monetary costs in terms of direct training costs and foregone earnings in order to increase their human capital. How does trade influence this individual investment decision?

A standard model which provides basic insights into the human capital investment decision is the Ben Porath Model (Ben Porath (1967)). This model predicts that the optimal amount of human capital investment depends on the wage rate per unit of human capital, the cost of training and the rate of obsolence. Bartel and Sicherman (1998) show that in the Ben Porath Model an increase in the wage rate per unit of human capital unambiguously increases investment in each period. Raising the productivity of human capital may reduce the cost of training and/or increase the value of time in training relative to work. Both changes enhance investment in training. On the other hand, the introduction of new work processes may make existing human capital obsolete. A higher rate of obsolence of human capital may lower investment in human capital.

If opening up to trade induces countries to specialize in the production of goods whose production technology carries a low rate of learning, then human capital accumulation is likely to decrease. But if trade leads to technology transfer then opening up to trade may speed up learning in technologically less advanced countries because implementing and working with the new technology increases the knowledge of workers. This positive effect of trade on human capital accumulation is reinforced if the transferred technology is skill biased by raising the demand for skilled workers relative to unskilled workers permanently. A higher relative demand for skilled workers leads to an increase in the wage rate per unit

of human capital, triggering human capital investment. At the same time the transfer of skill-biased technologies may depress investment in human capital if, for example, the introduction of new products or production technologies makes existing skills obsolete at a faster rate.[9]

Consistent with the idea that trade increases the demand for skilled labor, there exists empirical evidence of a positive association between trade and relative wages of skilled workers. Using cross-country data, Denny, Harmon and Lydon (2001) identify higher returns to education in more open countries. Several country studies that analyze the effect of trade on relative wages of skilled and unskilled workers conclude that technology transfer is the most likely reason for the increase in wage inequality (e.g. Robbins (1994, 1995), Hanson and Harrison (1994)).

Still, observing higher relative wages in more open economies does not allow to conclude that trade enhances human capital accumulation since relative wages are likely to be affected by country specific factors, such as technology, supply of human capital or labor market regulations. Direct evidence on the relation between trade and human capital accumulation is far from conclusive. Using a cointegration analysis, Chuang (2000) finds a bidirectional Granger causality between exports and the share of individuals who have attained higher education in Taiwan. Alcala and Ciccone (2001) conclude that trade increases productivity in the cross-country context, but find no statistically significant association between openness and the average level of human capital, as measured by years of education. None of these studies analyzes the effect of trade on on-the-job human capital accumulation.

This is not the first study using data on US immigrants in order to deduce information about their country of origin. Hanushek and Kim (1999) and Bratsberg and Terrel (2002), for example, analyze the effect of home country school quality on earnings of US immigrants. Hanushek and Kim (1999) find a strong and positive effect of international math and science test scores on earnings and returns to education of US immigrants. Bratsberg and Terrel (2002) conclude that holding per-capita GDP constant, immigrants from countries with lower pupil-teacher ratios and greater expenditures per pupil earn higher returns to education in the US. Borjas (1998) provides empirical evidence about the effect of source country characteristics on US immigrant quality. This is the only study to my knowledge that relates openness to earnings of US immigrants. He finds no significant effect of openness on the log entry wage of US immigrants when controlling for country fixed effect and/or educational attainment. None of these studies analyzes the effect of home country characteristics on on-the-job human capital accumulation of US immigrants.

2.3 Estimating the Effect of Trade on Returns to Experience

This chapter addresses the question whether trade increases or decreases on-the-job human capital accumulation by relating US returns to home country experience of immigrants to home country openness. The methodology used is similar to the two-step procedure

[9] The transfer of new technologies may not only affect the optimal amount of human capital investment, but also the types of skills which workers would like to acquire. Workers may, for example, be more likely to invest in the accumulation of skills that are more highly valued at the world technology frontier.

proposed by Card and Krueger (1992). The first step consists of estimating a Mincerian earnings equation to obtain estimates of country-specific returns to home country experience. In the second step, these estimated returns to home country experience are regressed on a measure of home-country openness and other control variables.

In the first step, a Mincerian earnings equation is estimated for each country separately. This equation relates log of earnings to years of schooling, potential labor market experience and its square. Labor market experience of immigrant $i$from country $j$can be decomposed into pre-migration experience (H_{ij}) and post-migration experience (U_{ij}). Assuming that the effect of experience in a country is linear in experience and its square, the earnings function of immigrants who completed their education in their source country can be written as

$$\ln y_{ij} = \alpha_j + \beta_j S_{ij} + \theta_{1j} H_{ij} + \theta_{2j} H_{ij}^2 + \gamma_{1j} U_{ij} + \gamma_{2j} U_{ij}^2 + \eta_{ij}. \tag{6}$$

The return to home country experience equals $\frac{\partial \ln y_{ij}}{\partial H_{ij}} = \theta_{1j} + 2\theta_{2j} H$. θ_{1j} is the slope of the log earnings experience profile. θ_{2j} captures the curvature and is usually negative, leading to the familiar concave experience earnings profile. H is the number of years at which returns to home country experience are evaluated.

The coefficients in equation (6) are not held constant across countries since there exists convincing evidence that the intercept as well as returns to individual characteristics of US immigrants, such as education or time spent in the US, are likely to vary across countries of origin. Borjas (1998), for example shows, that the log entry wage varies with source country characteristics. Hanushek and Kim (1999) and Bratsberg and Ragan (2002) provide evidence that returns to education vary substantially across countries, reflecting both differences in quality of education and transferability of skills.

The question whether trade increases or decreases on-the-job human capital accumulation is addressed in this study by relating home country openness of US immigrants to their returns to home country experience. Assuming a linear relation between openness and return to experience, this question translates into

$$\theta_{1_j} + 2\theta_{2j} H = a_H + b_H Open_j. \tag{7}$$

where $Open_j$ is some measure of openness in country j. A positive (negative) sign of the estimator of the coefficient b_H indicates that trade increases (decreases) on-the-job human capital accumulation. The marginal effect of openness on returns to home country experience is restricted to be constant across countries in specification (7) . This assumption will be relaxed during the empirical analysis for some specifications and b_H will be allowed to vary for sub-groups of countries.[10]

[10] Openness does not only vary across countries but also over time t, that is

$$\theta_{1jt} + 2\theta_{2jt} H = a_{jH} + g_{tH} + bHOpen_{jt}. \tag{8}$$

Identifying the home country fixed effect (a_{jH}) and the time effect (g_{tH}) requires to construct a panel data set on returns to experience. This is severely constrained by the limited amount of observations available for a large number of countries in the US Censuses.

Relying on the fact that the return to experience captures productive capabilities attributable to on-the-job human capital investment, this estimation strategy requires to exclude that factors that are not related to on-the-job human capital investment may generate the upward slope of the experience earnings profile at the beginning of a worker's career. In a search environment, for example, wages may grow with labor market experience because workers may improve the quality of their jobs by means of job search (see for example, Jovanovich (1979)). Moving to the United States is likely to imply for immigrants that the search capital is lost. Employer schemes to economize on costs of monitoring (Lazear (1981)) and turnover costs (Salop and Salop (1976)) may also generate an upward sloping experience earnings profile but are unlikely to explain positive returns to home country experience of US immigrants.[11] It is therefore reasonable to assume that returns to home country experience of US immigrants are related to on-the-job human capital investment.

To obtain an estimate of the return to home country experience, I substitute potential experience $E_{ij} \equiv H_{ij} + U_{ij}$ for home country experience H_{ij},

$$\begin{aligned} \ln y_{ij} = {} & \alpha_j + \beta_j S_{ij} + \theta_{1j} E_{ij} + \theta_{2j} E_{ij}^2 \\ & + (\gamma_{1j} - \theta_{1j}) U_{ij} + (\gamma_{2j} + \theta_{2j}) U_{ij}^2 - (2\theta_{2j}) E_{ij} U_{ij} + \eta_{ij} \end{aligned} \tag{9}$$

where $\ln y_{ij}$ is the log of annual earnings for immigrant i from source country j. S_{ij} is a series of dummy variables for different degrees of schooling. U_{ij} is measured as the difference between the census year and the year at the midpoint of the year of immigration bracket.[12] As can be seen from equation (9), the coefficient on U_{ij} consists of the difference between the return to post-migration and pre-migration experience. Potential experience E_{ij} is defined as age minus $years\ of\ education$ minus six.

The second step of the two-step procedure consists of regressing the estimated returns to experience on a measure of openness, that is

$$\widehat{\theta_{1j}} + 2\widehat{\theta_{2j}} H = \alpha_H + \beta_H Open_j + \gamma_H X_j + u_j \tag{10}$$

X_j is a set of observed country-specific characteristics, such as GDP per capita, investment per worker, average years of education in the home country and governmental quality. These variables will be discussed in detail when presenting the results. Unobserved country-specific characteristics are captured by u_j.

Under the assumption that openness affects only the slope of the earnings-experience profile but not its curvature, the efficiency of the estimator of β_H could be improved by estimating the effect of openness in one step. The two-step procedure, however, has several important advantages. First, it provides a straight-forward interpretation of the results by allowing to estimate the effect of openness on returns to home country experience and not only on the slope of the earnings-experience profile. Second, being computationally

[11] In these models wages grow because firms defer compensation in order to prevent workers from shirking (Lazear (1981)) or in order to induce a self-selection of heterogeneous workers that enhances productivity (Salop and Salop (1976)).

[12] Data on US immigrants is taken from the 1980 and 1990 US Censuses.

less burdensome it facilitates the estimation of extremely flexible forms of the first stage regression. In one of the specifications presented below returns to experience are, for example, allowed to vary with level of education. Third, it allows to illustrate the diversity in returns to experience across countries.

A special case of (7) is to assume that with the exception of θ_{1j} the coefficients on the Mincerian equation do not vary across countries. This implies that openness can only affect the slope of the experience-earnings profile but not its curvature.

Under this assumption, equation (9) may be written as

$$\begin{aligned} \ln y_{ij} &= \alpha + \beta S_{ij} + a_0 E_{ij} + b_0 E_{ij} Open_j + \theta_2 E_{ij}^2 - 2\theta_2 E_{ij} U_{ij} \\ &\quad + (\gamma_1 - a_0) U - b_0 U_{ij} Open_j + \eta_{ij} \end{aligned} \tag{11}$$

This equation forms the starting point of my empirical analysis. The results will be presented in the following section.

2.4 Data Analysis

My empirical analysis uses data from the 1980 and 1990 US Censuses.[13] The dependent variable of the Mincerian earnings equation is the natural logarithm of the annual wage or salary income in the year preceding the census. The set of control variables includes potential experience, dummies for each year of schooling, years spent in the US and its square, married with spouse present and dummy variables indicating whether the respondent speaks only English or speaks English very well, health limiting work, residence in SMSA, eight census divisions and year of immigration. To control for changes in labor market conditions a dummy indicating Census year 1980 is added to the regression and interacted with regional and educational dummies. Interaction terms with the Census year dummy and other explanatory variables are not statistically significant and are therefore excluded from the specifications. Descriptive statistics are provided in table $I.1$.[14]

The summary statistics of trade used in this analysis is the natural logarithm of the mean of Open, where the mean is calculated from 1970 to 1980. I will refer to this measure as log Open.[15] Using the logarithm of this summary measure of trade implies that the effect of a one percentage point increase in Open on the dependent variable is larger the lower the level of openness.

Table $I.2$ presents the results of the Mincerian earnings equation for the two censuses. As can be seen in the last column of table $I.2$, which combines the 1980 and 1990 Census, the estimated return to home country experience evaluated at five year experience is 1.8 percent a year and declines to 1.4 percent when evaluated at ten years of experience. It is a well documented fact that returns to home country experience of immigrants are on average low compared to returns to experience of native born US citizens. Using data

[13] The data are available online at http://www.ipums.org. For more information on the data, see Ruggles and Sobek (1997).

[14] A detailed description of the data can be found in the data appendix.

[15] Open is defined as the ratio of imports plus exports in exchange rate US$ relative to GDP in purchasing-power-parity US$. Other studies that use this measure are Alcala and Ciccone (2001) and Dollar and Kraay (2002).

from the 1970 Census, Chiswick (1978), for example, reports returns to experience of 1.4 percent for immigrants and 2.1 percent for US natives.

Adding openness to the regression and estimating equation (11) leads to the estimates presented in table $I.3$. The estimated return to home country experience amounts to 2.1 percent evaluated at 5 years of labor market experience and the mean of log Open. Imposing the constraints on b_0 and θ_2 implied by equation (11) reduces the estimated return to home country experience to 1.6 percent. The coefficient on the interaction term between log Open and experience has a positive sign and is significant.[16] Increasing Open from 0.2 to 0.3 raises the return to home country experience by 0.2 percentage points if coefficients are unconstrained.[17] Taking a country from the 10th percentile to the 90th percentile of log Open raises the estimated return to home country experience by 1.2 percentage points and increases to 1.3 percentage points in the constrained regression.

Based on the results, figure $I.1$ displays the predicted log earnings-experience profiles for two US immigrants. Both immigrants are assumed to have the same individual characteristics, but the source countries of the immigrants differ in their degree of openness. As equation (11) imposes that neither the intercept of the Mincerian earnings equation nor the return to individuals characteristics vary with country of origin, the intercept of the log earnings-experience profile is the same for both immigrants. Moreover, since equation (11) assumes that openness affects only the slope but not the curvature of the profile, the difference in returns to experience among the two immigrants remains constant throughout their work life.

Restricting the intercept of the Mincerian earnings equation to be constant across countries may lead to a biased estimate of the effect of openness on the slope of the log earnings-experience profile.[18] If initial wages of US immigrants from more open economies are higher, then the effect of openness on returns to experience is likely to be overstated.[19] Controlling for country fixed effects in the last column of table $I.3$ allows for cross-country variation in the intercept and leads to an estimated return to home country experience of 1.9 percent evaluated at 5 years of labor market experience and the mean of log Open. When controlling for country fixed effects, the coefficient on the interaction term between experience and openness remains significant, but drops from 0.006 to 0.002. This implies that raising Open from 0.2 to 0.3 leads to an increase in the annual return to experience by 1 percentage point.

As pointed out above empirical evidence suggests that not only the intercept of the

[16] The calculation of the standard errors takes into account heteroscedasticity and clustering. Not controlling for clustering may lead to a serious downward bias in the OLS standard errors when adding aggregate market variable to micro units. (see Moulton (1986, 1990))

[17] The change in Open from 0.2 to 0.3 corresponds approximately to an increase from the 20th percentile to the median value. To give an example, this change corresponds to South Korea (Open equals 0.20) as compared to Taiwan (0.32) or Australia (0.20) as compared to Canada (0.33).

[18] It may also lead to a biased curvature of the profile.

[19] Immigrants from more open economies may not only have higher returns to experience, but also higher entry wages. As pointed out above, Borjas (1998) finds no significant effect of openness on the entry wage level of US immigrants as soon as he controls for country fixed effects and/or initial educational attainment. However, he finds a positive and significant effect of GDP per capita on log entry wages. Given that GDP per capita and openness are positively correlated, trade is likely to affect log entry wages as long as GDP per capita is not controlled for.

Mincerian earnings equation, but also the returns to individual characteristics, such as education or post-migration experience, are likely to vary across source countries of US immigrants. This issue can be addressed by estimating the effect of openness on returns to experience by means of the two-step method.

2.5 Openness and Returns to Experience

The first step of the two-step method consists in estimating the Mincerian earnings equation for each country separately, yielding estimates of the country-specific returns to home country experience.[20] Differences in returns to home country experience across countries of origin of US immigrants are substantial. Evaluated at 5 (10) years of labor market experience statistically significant returns range from 7.8 (6.6) percent for immigrants proceeding from Norway, Finland and Japan to 1.4 (1) percent for Philippines, Mexicans and Guatemalans (see table $II.4$). The relatively low average return to home country experience of US immigrants identified in previous studies is henceforth likely to be determined by the fact that immigrants from Mexico form a large share of the overall US immigrant population. Nearly 32 percent of immigrants in my sample are Mexicans. Taking the unweighted average across the 93 countries in the sample leads to a return to home country experience of 3.1 percent with a standard deviation of 3.7.

Returns to home country experience change with years of experience. If a country with a higher log earnings experience slope θ_{1j} has a larger coefficient on the curvature of the log earnings experience profile in absolute value then the ranking in returns to experience of two countries may be reversed when evaluating returns at different years of experience.[21] Illustrating this fact figure 2 shows that the difference between returns to experience of immigrants from Korea and Taiwan, for example, increases with years of home country experience, while the contrary holds for Belgium and Portugal. For the analysis below, I use five years of labor market experience as the year at which to evaluate returns to home country experience experience. [22]

The second step of the estimation strategy consists of regressing estimated returns to home country experience of US immigrants on home country openness in order to understand how trade relates to on-the-job accumulation of human capital. Table $II.5$ presents the results for three different samples: all countries, non-Oil countries and non-OECD/non-Oil countries. The dependent variable is the estimated return to home country experience evaluated at five years of labor market experience in percent. As in section 4, the statistic of openness is the natural logarithm of the mean of Open, where the mean

[20] Returns to experience are only estimated for countries with at least 50 US immigrants that satisfy the election criteria, using data from the 1980 and 1990 census jointly. An alternative strategy would have been to estimate country-specific returns to experience per census year. However, variation in returns to experience across census years is not significant, inducing me to stack the 1980 and 1990 census. This increases the number of observations used for estimating the country-specific returns to experience and therefore the precision of the estimates.

[21] This may arise, for example, if the introduction of new technologies in a country induces young workers to invest more in on-the-job learning, but makes knowledge of older workers obsolete at a faster rate.

[22] Results for other years of experience are available upon request.

is calculated from 1970 to 1980 in order to control for short-term fluctuation.[23]

Regressing estimated returns to home country experience on openness yields a positive and significant coefficient, as shown in specification (I) of table $II.5$. The coefficient amounts to 1.290 when using the entire sample and reduces slightly, when dropping the oil exporting countries. Increasing Open from 0.2 to 0.3 raises the annual return to home country experience by 0.5 percentage points in the non-Oil sample. Given the low returns to home country experience of US immigrants, this effect is quite large.

Restricting the sample to non-OECD countries depresses the effect of openness on returns to experience. Still it remains positive and significant.[24] Controlling for regional dummies in specification (III) approximately doubles the R-square, but does not alter the sign and the significance level of the coefficients on log Open.[25]

These findings indicate a positive and significant effect of trade on returns to home country experience of US immigrants. They do not imply that US immigrants proceeding from more open countries receive more training in their home country. Human capital is not completely transferable across countries. Some part of it evaporates as immigrants cross the border since an immigrant may bring skills which are not marketable in the US. A share of human capital accumulated on the job is firm-specific and many general skills are tied to a particular product market or technology. As a consequence, higher returns to home country experience do not necessarily indicate that an immigrant accumulated a higher quantity of human capital during his working life. But they show that he accumulated more skills that are valued by the US labor market.

This interpretation of returns to experience is not inconsistent with the story underlying the theoretical link between openness and human capital accumulation, arguing that immigrants accumulate skills because they are in contact with production technologies developed in countries which are closer to the world technology frontier. But it is exactly skills related to more advanced technologies that are likely to be valued by the US labor market.

Confusion about the causal effect of trade on returns to experience can arise from omitting variables that are correlated with both returns to experience and openness. As long as neglected elements are fixed within regions this is of no concern as differences in unobservables are absorbed by regional dummies. But if a positive correlation of unmeasured determinants of returns to experience and openness persists even after controlling for regions, the estimated coefficient on openness does not reveal the causal effect of openness on returns to experience. This issue can be solved by including country-specific variables in the set of explanatory variables that affect returns to experience and are correlated with log Open. Prime candidates are GDP per capita and average years and quality of schooling.

The correlation coefficient between estimated returns to home country experience and

[23] A detailed description of variables can be found in the Data Appendix.

[24] Standard errors are calculated using the White estimator in order to correct for heteroscedasticity. Disturbances are likely to be heteroscedastic as the dependent variable in the second stage regression is itself an estimated regression coefficient.

[25] To control for region-specific effects, I keep regional dummies in the specification if they are at least statistical significant at the 10-percent level. There is one exception to this rule. If the deletion of a statistical insignificant regional dummy increases the Akaike criterion, the regional dummy is kept.

log of real GDP in the entire sample is 0.295.[26] This positive association between log of real GDP and returns to experience is not surprising. Resources devoted to schooling and training tend to be higher in richer countries. But even after controlling for school and training resources a significant positive effect of GDP per capita on returns to experience is likely to persist, as countries with a higher GDP per capita are more likely to have production technologies similar to the US. This implies that the types of skills immigrants from richer countries learn on the job are more valued by the US labor market than skills obtained in less developed countries.

At the same time a large empirical literature provides evidence of a positive association between GDP per capita and trade. The positive correlation coefficient of 0.475 between log of real GDP and log Open in the data is consistent with these findings and indicates that not controlling for GDP per capita is likely to lead to an overestimation of the effect of openness on returns to experience.

As expected, regressing returns to home country experience on GDP per capita yields a significantly positive coefficient on GDP per capita and reduces the coefficient on log Open in all three samples. Specification (IV) in table $II.5$ reveals that once GDP per capita and regional dummies are controlled for, the coefficient on log Open falls to approximately 0.830, but remains significant at the 5 percent significance level in all three samples.

Average years of schooling as well as quality of schooling are likely to be positively associated with returns to experience. According to the Ben-Porath Model, individuals with more schooling and better schooling tend to invest more in human capital on the job. This arises from the fact that individuals with a higher level of education are likely to be more able and/or face lower discount rates. Higher average years of schooling may further reflect a higher demand for human capital, increasing both the profitability of investing in schooling and on-the-job training. A higher level and better quality of average schooling may also lead to lower costs of post-school investment and/or increase its benefits for two reasons. First, in the presence of human capital externalities working hand in hand with skilled workers may enhance the individual's learning on the job. Second, a higher level of average education is likely to be positively correlated with the level of human capital of the training staff.

A higher average level and better quality of schooling is also likely to be positively correlated with openness since it may increase the demand for high technology goods. Evidence on this channel is, for example, provided by Caselli and Coleman (2001). They show that high levels of educational attainment are important determinants of adopting computer technology. Given the positive correlation between schooling and returns to experience as well as schooling and openness, controlling for the average level and the quality of schooling in the second stage regression is likely to reduce the coefficient on openness.

Information on average years of schooling in the home country is taken from Barro and Lee (1993). This variable is only available for a subset of the sample. Regressing log Open on estimated returns to home country experience in the sample for which data on average years of schooling is available does not substantially alter the coefficient on log Open, as can be seen in specification (I) of table $II.6$.

[26] Consistent with log Open, the log of real GDP per capita is defined as the log of its mean calculated from 1970 to 1980.

As expected, returns to experience are higher in countries that have a higher level of average schooling. Controlling additionally for average years of schooling reduces the coefficient on log Open. The coefficient on average years of schooling is, however, only significant when using the entire sample and as long as GDP per capita is not added to the set of explanatory variables. Similarly, other measures of the quantity of schooling, e.g. the log of average years of schooling and the percentage of the population with primary and secondary school completed, are not significantly associated with estimated returns to experience when controlling for openness and GDP per capita. Average years of schooling is the variable that maximizes the R-square. Measures of school quality, such as the quality indices from Hanushek and Kim (1999) and measures such as the pupil-teacher ratio and real expenditure per pupil from Barro and Lee (1993) do not yield statistically significant results. Since the coefficients on measures of quality and quantity of schooling turn insignificant once GDP per capita and openness are controlled for and since adding them to the regression has only a negligible effect on the R-square, the following results will be presented without controlling for measures of schooling.[27]

Not only GDP per capita and educational attainment are likely to affect the return to home country experience. On-the-job accumulation of human capital occurring in the manufacturing sector is likely to be more highly valued by the US labor market than skills acquired in the agricultural sector. Conditional on regional dummies, the partial correlation coefficient between the share of manufacturing and returns to home country experience equals 0.25 and is significant at the 5 percent level. The share of agriculture is - as expected- negatively correlated with these returns.

Estimation results presented in table $II.7$ show that independent of the sample the coefficient on the share of manufacturing is positive. Apart from non-OECD sample, this effect is significant, when controlling for GDP and regional dummies, indicating that on average returns to home country experience are higher for immigrants proceeding from countries with a higher share of manufacturing. The effect of an increase in the share of manufacturing is small compared to the effect of an increase in openness. Raising the share of manufacturing by 0.1, which is equal to one standard deviation, increases the predicted return to home country experience by 0.005 percentage points. An increase in Open from 0.2 to 0.3, on the other hand, raises these returns by 0.41 percentage points. The marginal effect of Open on returns to experience declines as openness increases. Still, raising the trade to GDP share from 0.8 to 0.9 implies that the return to home country experience is predicted to be 0.11 percentage points higher. Amounting to 0.24 the standard deviation of openness exceeds substantially the standard deviation of the share of manufacturing. Increasing openness from 0.2 by one standard deviation raises predicted returns to home country experience by 0.8 percentage points. In none of the specifications presented in table $II.7$ the coefficient on the share of agriculture is significant.

Institutions and government may provide an environment to individuals and firms that encourages the accumulation of skills and the investment in new technologies (Hall and Jones (1999)). To capture this notion of governmental and institutional quality, I follow Hall and Jones (1999) in using an index of government antidiversion policy (GADP).

[27] The R-square of a regression of returns to experience on log Open, log of GDP per Capita and regional dummies in the sample that provides information on average years of schooling is 0.303 for all countries, 0.295 for the non-Oil countries and 0.133 for the non-OECD/non-Oil Countries.

The index is described in detail in section $A.2.2.$ of the appendix. It assumes values between zero to one and increases in value with the effectiveness of government policies in supporting an environment favorable to productive activities. Among the countries with the highest GADP figure Switzerland (GADP of 1), Netherlands (0.988), Sweden (0.987) and New Zealand (0.986). GADP is lowest for Liberia (0.197), Iraq (0.226) and Haiti (0.236).

The results of specification (IV) in table $II.7$ confirm a positive effect of governmental quality on returns to experience. The effect is sizeable. An increase of GADP by one standard deviation (0.2) raises returns by 1.6 percentage points in the entire sample and by 2.1 percentage points for US immigrants proceeding from non-OECD countries. The strong effect of GADP on returns to experience is in line with the results of Alcala and Ciccone (2004). They find that institutional quality is a highly significant determinant of human capital. Adding GADP to the set of explanatory variable leads to a drop in the coefficient on log Open. The coefficient of 0.512 in the sub-sample of non-OECD/non-Oil countries (specification IV) indicates that an increase in Open from 0.2 to 0.3 raises returns to experience of US immigrants by 0.2 percentage points. When additionally controlling for the share of manufacturing, the coefficients on GDP per capita and the share of manufacturing become insignificant. The same holds for all regional dummies. The coefficient on openness, however, remains marginally significant for non-Oil countries and non-OECD/non-Oil countries.

High investment rates are a precondition for technology adoption and hence learning by doing.[28] It is henceforth not surprising that investment rates per worker have a significantly positive effect on returns to experience of US immigrants as shown in table $II.8$. Adding investment rates per worker to the regression, renders the coefficient on GDP per capita insignificant and negative as can be seen in specifications (III) and (IV). This is likely to be the result of a strong collinearity between GDP per capita and investment per worker. The correlation coefficient between GDP per capita and investment per worker amounts to 0.925 for both the entire sample and the sample of non-oil exporting countries. Regressing log of investment per worker on log of Open, log of GDP per capita and regional dummies leads to an R-square of 0.88. Only 12 percent of the variation in log investment per worker is independent of the included explanatory variables. The positive correlation of both GDP per capita and investment per workers with returns to experience combined with the high correlation among the two variables may explain the negative sign of the partial regression coefficient of GDP per capita in this specification.

Since investment per worker is likely to be related to institutional and governmental quality, GADP is added to the regressions in the last two columns of table $II.8$. Log investment per workers turns insignificant once GADP is controlled for, as can be seen by comparing column (III) with (V).

These results indicate a positive and significant effect of openness on returns to home country experience of US immigrants, even when restricting the sample to immigrants from non-OECD countries. This is consistent with the hypothesis that trade increases human capital accumulation in less developed countries through technology transfer. Technology transfer may affect human capital accumulation if implementing and working with

[28] See literature on embodied technological progress, for example, Greenwood et al. (1997).

new technologies increases the knowledge of workers.

The hypothesis that openness leads to on-the-job learning by doing through technology transfer, may be tested by relating measures of technology transfer to estimated return to experience. Technology transfer takes place either through the production of goods in less developed countries which were already produced in more developed economies, through the importation of intermediate goods or R&D spillover. R&D spillover are likely to work through imported goods from more developed countries.[29] This suggests to use technologically intensive imports from more developed economies as a proxy for technology transfer. But technology transfer may not only be related to imports, but also to exports. Exporting to more developed countries may require to implement strategies that increase firm-level efficiency. In addition, contact with foreign customers is likely to create an environment of learning opportunities.

If trade leads to on-the-job human capital accumulation through technology transfer, then for less developed countries imports from or exports to non-OECD countries can be expected to have a positive effect on returns to experience. The same applies to imports of technology intensive goods. Regressing the estimated returns to experience on various measures of imports and exports, such as exports and imports by trading partner (OECD versus non OECD) and imports of computers per worker yields the coefficients presented in table $II.9$.[30] Two specifications are displayed in this table. Specification (I) controls for a measure of openness and regional dummies. GDP, the share of manufacturing and GADP are added in specification (II). The effect on returns to home-country experience remains positive independent of the trade measure used. The coefficient on computer imports is statistically highly significant in both samples in specification (I). The same applies to manufacturing exports.

Summarizing, these results indicate a positive and significant effect of openness in the home country on returns to home country experience of US immigrants. High investment rates are a significant determinant of on-the-job human capital accumulation as well as governmental and institutional quality. The effect of trade on on-the-job human capital accumulation remains positive when restricting the sample to immigrants from non-OECD countries. This finding supports those theories that claim that opening up to trade leads to technology transfer, thereby creating learning opportunities in less developed countries.

2.6 Robustness Checks

2.6.1 Self-Selection

The result that US immigrants proceeding from more open countries have a higher return to home country experience, does not necessarily allow to conclude that trade increases on-the-job human capital accumulation of the average home country resident. US immigrants

[29] For example, Coe, Helpman and Hoffmaister (1995) find that total factor productivity in developing countries is positively associated with R&D expenditure abroad and that the spillover from an industrial country to a developing country are proportional to the share of the industrial country's imports in the developing countries' gross domestic product.

[30] Trade measures are taken from Caselli and Coleman (2001) who construct the data using information provided by Feenstra, Lipsey and Bowen (1997). For a detailed description of the data see Caselli and Coleman (2001). With the exception of log Open all variables are defined in per worker terms.

do not form a random sample of the home country population. The decision to migrate is, among other things, determined by a comparison of earnings opportunities across home and destination country. As a consequence, the same covariates that affect earnings, such as home country experience, schooling and ability do also affect the probability to migrate. The US return to home country experience of US immigrants does therefore not necessarily have any predictive value about the US return to home country experience of the average home country resident.

A short sketch of the Roy Model along the lines of Borjas (1987, 1998) illustrates this nicely. Suppose that earnings of residents in country j are given by w_{0j}. If the entire home country population were to move to the United States, their earnings distribution in the US would be given by w_{1j}. w_{0j} and w_{1j} may be written as

$$\begin{aligned} \ln w_{0j} &= \mu_{0j} + \theta_{0j} X_j + v_{0j} \\ \ln w_{1j} &= \mu_{1j} + \theta_{1j} X_j + v_{1j} \end{aligned}$$

For the simplicity of the exposition, let's refer to X_j as home country experience. Assume that the return to home country experience does not vary with years of experience. θ_{0j} is the return to home country experience in the home country, while θ_{1j} is the US return to home country experience of the average home country resident.

Residents of source country j decide to migrate, i.e. $I > 0$, if wages in the US net of migration costs c_j exceed wages in the home country.[31] This migration condition may be written as

$$\begin{aligned} \Pr ob(I &> 0) = \Pr ob(\ln w_{1j} - c_j - \ln w_{0j} > 0) \\ &= \Pr ob(\mu_{1j} - \mu_{0j} + (\theta_{1j} - \theta_{0j}) X_j - c_j + v_{1j} - v_{0j} > 0) \end{aligned}$$

Conditional on a given level of home country experience, the probability to migrate increases the higher the US return to home country experience relative to the home country return, holding all other wage determinants constant. Under the assumption that v_{0j} and v_{1j} have a bivariate normal distribution with zero mean, standard deviations σ_0 and σ_1 and correlation coefficient ρ, the substitution of the migration condition into the wage equation yields

$$E(\ln w_{1j} | X_j, I_j > 0) = \mu_{1_j} + \theta_{1j} X_j + \frac{\sigma_{0j}\sigma_{1j}}{\sigma_{vj}} (\frac{\sigma_{1j}}{\sigma_{0j}} - \rho_j) \lambda_j$$

[31] Not only the differences between US and source country earnings opportunities as well as migration costs determine the decision to migrate. US immigration laws matter as well. Furthermore, the decision to migrate to the US is not exclusively based on economic gains, but also on family ties and political reasons. Census data does not allow to control for these factors as it neither provides information about the legal status of the immigrant nor the reason for immigration. The Roy model further assumes that migration decisions are irreversible and hence ignores the issue of self-selection induced by selective return migration. Last, self-selection may also occur when immigrants decide in which US division to reside. The regional variation in demand for skills, however, seems to be a less important determinant for the settlement of immigrants across regions than it is for native borns (see Bratsberg and Terrell (2000)).

where $\lambda_j = E(v_j|v_j > z_j) = \phi(z_j)/(1-\Phi(z_j)$, $v_j = (v_{1j} - v_{0j})/\sigma_{vj}$, $z_{j=}(\mu_{0j} - \mu_{1j} + c_j - (\theta_{1j} - \theta_{0j})X_j)/\sigma_{vj}$ and $\sigma_{vj} = \sqrt{\sigma^2_{vj-}\sigma_{0j}\sigma_{1j}}$. λ_j is called the inverse Mills ratio. $1 - \Phi(z_j)$ is the probability to migrate. (Heckman (1979))

The fact that the truncation of the error term depends on X_j implies that the expected value of the estimated return to home country experience of US immigrants differs from the US return to home country experience of the average home country resident if λ_j is not controlled for, as

$$E(\widehat{\theta_j}) = \theta_{1j} + \sigma_j Cov(\lambda_j, X_j)/Var(\lambda_j) \tag{12}$$

where $\sigma_j = \frac{\sigma_{0j}\sigma_{1j}}{\sigma_{vj}}(\frac{\sigma_{1j}}{\sigma_{0j}} - \rho_j)$.

Equation (12) shows that the expected value of the return to home country experience estimated using the sample of US immigrants $E(\widehat{\theta_j})$ is composed of two terms. There is a direct effect of home country experience on log earnings which is given by θ_{1j}, the parameter of interest. The second term captures the fact that home country experience affects the probability to migrate. Not controlling for this term implies that the expected value of returns to home country experience estimated on the sample of US immigrants does not allow to identify the US return to home country experience of the average home country resident.

What is the direction of this bias and more importantly how does it relate to the estimated effect of openness on returns to experience?[32] Migration theory proposes and the empirical literature provides evidence that immigrants are positively self-selected. Given positive self-selection,

$$E(lnw_{1j}|X_j, I_j > 0) > E(lnw_{1j}|X_j)$$

and hence $\sigma_j > 0$.

According to the Roy model the sign of the covariance between the inverse Mills ratio and home country experience $Cov(\lambda_j, X_j)$ depends on whether the US return to home country experience exceeds or falls short of the home country return to home country experience. If the US return to home country experience exceeds the home country return, then the gain from migrating increases with home country experience and immigrants with more home country experience are likely to be drawn from a wider distribution of unobservable skills. Therefore, the truncation point and λ_j decreases as X_j rises and given positive selection, the return to home country experience estimated on a sample of US immigrants is lower then θ_{1j}.

But this is not the whole story. Experience of US immigrants is composed of home country experience and experience obtained when living in the US. The return to labor market experience varies according to whether the experience was acquired before or after migrating to the US. While in my sample the estimated return to home country experience evaluated at ten years of experience is 1.4 percent, the return to time spent in the US is 2.1 percent. It is a well documented fact that the return to home country experience

[32] Throughout this section I refer to the term bias as the difference between the expected value of returns to home country experience estimated on the sample of US immigrants and the US return to home country experience in the home country population.

is lower than the return to US experience of US immigrants (e.g. Chiswick and Miller (2000) and Borjas (1998)).[33]

Since the decision to migrate is a function of the expected discounted life-time gain from migration, the difference between pre and post-migration returns to experience determines the age at immigration. The fact that the return to post-migration experience exceeds the return to pre-migration experience may lead to a decrease in the probability to immigrate to the US as home country experience increases even if US returns to home country experience exceed home country returns. This would induce a positive correlation between λ_j and X_j and an upward bias of the return to home country experience estimated on the subsample of US immigrants.

US immigrants from a given country are on average younger than potential immigrants defined as home country residents who are between 15 and 64 years old. When arriving to the US, immigrants are on average 30 years old which compares to a mean age of 34 in the potential immigrant population.[34] US immigrants from all countries in the sample, with the exception of South Korea and South Africa, are younger at arrival then the potential immigrant population in the home country. Cross-country variation in mean age at arrival for immigrants is substantial, ranging from 26 year for Mexico and Saudi Arabia to 34 year for South Korea.

The probability to migrate for immigrants who completed their education in the home country is hump-shaped with respect to age. Constructing migration rates conditional on age and male gender for eleven five-year age brackets reveals that for 67 out of 81 countries in the sample on migration rates the probability to migrate is highest for immigrants who are between 25 and 29 years old.[35] Immigrants proceeding from Bahamas, Costa Rica, El Salvador, Guatemala, Mexico, Puerto Rico, Yemen, Saudi Arabia, Ireland, Sierra Leone and Saudi Arabia are most likely to immigrate between the age of 20 and 24. For immigrants from Sri Lanka, Bulgaria and Poland the probability to migrate is highest when they are between 30 and 34 years old. The cross-country difference in the age that maximizes the probability to migrate may reflect differences in the level of education across immigrant groups. The average Bulgarian and Sri Lankan immigrant, for example, is far more educated then the average US immigrant, while immigrants from El Salvador, Guatemala, Mexico, Puerto Rico and Yemen fall within the group with the lowest average educational attainment.

Controlling for the bias of the estimated return to home country experience induced by self-selection in the first-stage regression requires to account for the truncation of the error term. Adding a selection correction term in the form of the inverse Mills ratio to the Mincerian earnings equation in the first step may solve this issue if the unobservables have

[33] The relatively low return to pre-migration experience leads to an earnings disadvantage for immigrants relative to natives with similar labor market experience at arrival to the US. However, the fact the post-migration returns to experience tend to exceed returns to experience of US natives implies that with time spent in the US the relative earnings position of immigrants improves.

[34] Data on population within given age brackets is taken from the International Data Base of the US Census.

[35] These migration rates are constructed by estimating the number of immigrants at different age brackets living in the United States based on data of the 1980 and 1990 Census. By combining these estimates with data on the population within the same age bracket. Data on the population within age brackets is taken from World Development Indicators of the World Bank.

a joint normal distribution. This Mills ratio can be constructed by using the estimated migration rates conditional on age and male gender. Since education determines potential experience as well as age at arrival, I also use migration rates of male immigrants for three levels of schooling: less then seven years, seven to twelve years and more than twelve. These migration rates have been taken from Bratsberg and Terrell (2002).[36]

Controlling for selection does not change the effect of openness on returns to experience when controlling for log Open, log GDP per capita and significant regional dummies. This can be seen by comparing specification (I) of table $II.10$ with specification (IV) of table $II.5$. Once GADP and the share of manufacture are added to the regression in specification (II) the coefficient on log Open decreases by about 10 percent in the entire sample and by 30 percent in the non-OECD sample relative to the uncorrected coefficients if migration rates conditional on age are used to control for self-selection. Migration rates conditional on schooling are only available for a subset of countries. Adding them to the first step regressions reduces the sample size significantly as can be seen in the last two columns of table $II.10$. Despite the change in the sample, the coefficients on log Open are similar in specification (I) independent on whether migrations rates conditional on age or conditional on education are added to the first step regression.

2.6.2 Returns to Experience and Schooling

Log earnings experience profiles tend to be steeper for better schooled workers. An OECD study, for example, suggests that participation in job-related training programs is correlated with educational attainment (OECD (1997)). Similarly, Bartel and Sicherman (1998) provide empirical evidence that the probability of receiving training increases monotonically with education. Psacharopolous and Layard (1979) show that experience profiles are steeper for individuals with higher educational attainment. Using US panel data, Altonji and Pierret (1997) reach a similar conclusion. Based on data of 11 European countries, Brunello and Comi (2000) find that employees with tertiary education have steeper experience profiles then employees with upper secondary or compulsory education.

The same applies to US immigrants. Returns to home country experience of US immigrants are higher for immigrants with more years of education. Table $II.11$ shows that the slope of the home country experience profile is steeper for US immigrants with at least a high school degree as compared to immigrants with a lower level of schooling. At the same time the coefficient on the square of experience is higher for better schooled immigrants indicating a faster decrease in returns to experience. The largest gap between skilled and less skilled US immigrants is reached after approximately ten years of labor market experience. Controlling for fixed effects decreases the slope of the log earnings

[36] Relaxing the assumption of joint normality in order to identify the US return to home country experience in the home country population requires to satisfy an exclusion restriction,i.e. a regressor that affects the migration probability of immigrants from a given country differently, but does not determine earnings. As age at arrival does not only determine the probability to migrate but also earnings, the exclusion restriction is not satisfied. Immigrants may leave their country for political reasons. Wars or political turmoil are likely to affect the decision to migrate, but not wages. If these variables affect immigrants who immigrate at different years of immigration in a different way, they may be used in order to control for selection.

profile slightly. It leaves the fact unchanged that the log earnings profile is steeper for younger workers with higher educational attainment.

If returns to home country experience vary with education then the OLS estimator of the homogenous US return to home country experience may be written as a variance weighted average of the returns to home country experience of the different educational categories. As US immigrants are on average better educated then home country residents, heterogeneity in returns to experience implies that the average US return to home country experience estimated on a sample of US immigrants exceeds the average US return to home country experience in the home country population.[37]

If education affects returns to experience and if educational differences between home country and immigrants population are related to source country characteristics, then the estimated effect of openness on returns to experience will differ from the effect of openness on US returns to home country experience of the average source country resident. Consider, for example, that openness affects the decision to migrate by reducing migration costs because it familiarizes residents in the home country with the institutional, cultural and social environment in the United States. The decrease in migration costs is likely to be larger for workers with a high level of schooling relative to workers with a low level of schooling because of differences in literacy, language and technological skills. Openness may then have a larger effect of the migration probability of better schooled workers relative to less schooled workers. Given that returns to experience are higher for immigrants with more schooling, we would observe a positive correlation between openness and returns to experience because openness induces more skilled workers to leave the country, and not because openness induces more accumulation of on-the-job human capital.

But opening up to trade may also induce a decrease in the relative migration rate of skilled workers. As pointed out above, there exists empirical evidence that trade increases the demand for skilled workers. If openness raises the return to schooling or returns to home country experience in the home country relative to the respective return in the United States, openness may actually lead to a decrease in the immigration rate of highly skilled workers. In this case, the effect of openness on returns to home country experience would be underestimated.[38]

The positive effect of openness on returns to home country experience is not determined by the skill distribution of the US immigrant population. This is demonstrated by

[37] The concavity of the log earnings-experience profiles implies that the return to experience decreases with years of experience. There exists empirical evidence that this decrease is more pronounced for workers with a higher level of schooling (see for example, Brunello and Comi (2000)). Workers with a long labor market experience and a high level of schooling may therefore have lower returns to experience then comparable less schooled workers. Consequently, the claim that returns to experience are higher for more schooled workers refers in what follows to workers with few years of labor market experience.

[38] Difference in educational attainment between US immigrants and home country population varies substantially across countries, ranging from 2 to 18 years. It is largest for immigrants proceeding from Africa. US immigrants, for example, from Namibia and Mali form the group with the highest educational attainment of US immigrants with on average 18 years of schooling. At the same time educational attainment in these countries is among the lowest in the world. On the other hand, educational attainment of Mexican, Canadian, Italian, Greek and Portuguese US immigrants mimics rather well average educational attainment in their home country population.

regressing returns to home country experience of highly skilled and low skilled workers separately on log Open and other control variables in the first and second column of table $II.12$.[39] Comparing these coefficients with column (VI) in table $II.5$ reveals that the coefficient on log Open does not change significantly in the entire sample as well as the sample of non-oil countries. But the effect of openness on returns to experience of highly skilled US immigrants - as shown in column (II) - is not significant in any of the three samples. Apart from GADP, no explanatory variables is significant in this specification arising from the fact that the cross-country variance in returns to experience is substantially higher for more skilled workers. Since the variance of the returns to experience among highly skilled is relatively large, the mean square error of specification (II) is about four times higher than in specification (I), scaling up the standard errors of the coefficients.

Using the average estimated return to home country experience evaluated at the skill distribution in the home country does also not alter the principal findings. Column (III) of table $II.12$ uses average estimated returns to home country experience evaluated at the skill distribution in the home country as dependent variable. The results are very similar to the estimates presented in table $II.7$ for the entire sample and the sample of non-Oil countries. Increasing the share of trade in GDP from 0.2 to 0.3, raises the average return to home country experience in the non-Oil economies by about 0.35 percent. However, when restricting the sample to non-OECD economies the coefficient on Open is about 50 percent lower than the respective coefficient of table $II.7$. The coefficient on log Open does also not change significantly when evaluating returns to experience at the skill distribution of US immigrants as can be seen in the last column of table $II.12$.

Summarizing, these findings reveal that the effect of openness on returns to experience is not driven by cross-country differences in the educational attainment differential between home country residents and US immigrants. Controlling for heterogeneity in returns, however, decreases the coefficient on openness in the non-OECD sample and renders it insignificant.

2.6.3 English Speaking Origin

Returns to home country experience depend on whether the immigrant can transfer his knowledge and skills to the US economy. Transferability of human capital to the US is largely determined by English proficiency. Since countries where English is an official language tend to be more open, the estimated coefficient on openness may overestimate the effect of openness on returns to home country experience.

The finding of a positive and significant effect of openness on returns to experience applies to immigrants from English speaking and non English speaking countries alike. The results presented in table $II.13$ provide evidence that the positive effect of openness

[39] Highly skilled workers are defined as workers with at least a high school degree. The average return to experience of low skilled workers in this sample amounts to 2.18 percent (with a standard deviation of 2.587), while the corresponding return of highly skilled workers equals 2.965 percent (4.893).

Estimations presented in Table 12 exclude countries with less then 100 observations in order to increases the precision of the estimates which are obtained in the first step. This implies that Algeria, Liberia, Malta, Saudi Arabia, Sierra Leone, Singapore, Switzerland, Tanzania, Tunisia, Uganda and Yemen drop out of the sample.

on returns to home country experience is independent on whether the immigrant originates from a country where English is widely spoken or not. English speaking countries subsume all countries were English is an official language or widely used in certain population groups.[40] Columns (I) and (II) of table $II.13$ display the estimation results for non-English speaking and English speaking countries, respectively. The coefficient on openness is positive and significant for both specifications. The difference in the coefficients is not statistically significant, which is likely to reflect the fact that English proficiency is already controlled for in the first step regression.

2.6.4 Cultural Background

The question remains to be answered whether the effect of openness on home country experience may capture cultural differences among US immigrants. Re-estimating the first step Mincerian equation for the sample of immigrants who completed their education, but had no labor market experience in their home country allows to address this issue. If the effect of openness on returns to home country experience is determined by cultural differences, openness can be expected to exert a significant and positive effect on returns to US experience of US immigrants who had at least some exposure to the culture of their home country.

Controlling only for openness leads to coefficients close to zero independent of the sample, as can be seen in column (I) of table $II.14$. Adding significant regional dummies in column (II) and GDP per capita in column (III) increases the coefficients on log Open in the different samples. Still they remain insignificant. Once GADP and the share of manufacturing are added to the regression the coefficient on openness falls to zero again. Cultural background is therefore unlikely to explain the effect of openness on returns to home country experience.

2.7 Conclusion

This chapter provides empirical evidence that trade increases on-the-job human capital accumulation. This finding is not the result of self-selection, heterogeneity in returns to experience, English speaking origin or cultural background. The effect of trade on on-the-job human capital accumulation remains positive when restricting the sample to immigrants from non-OECD countries, supporting the claim that trade leads to technology transfer, thereby creating learning opportunities in less developed countries.

Human capital accumulation is considered an important determinant of economic growth. While a considerable amount of research has been dedicated in explaining cross-country differences in the accumulation of human capital in school and research organizations, less is known about on-the-job accumulation of human capital.

But on-the-job human capital accumulation is likely to contribute considerably to economic growth. Historically, the acquisition of human capital mainly took place on-the-job. The extended schooling system and the consequent late entry into the labor market are a phenomenon of the last decades. Moreover, high educational attainment is a characteristic of rich countries. For many less developed economies, the main bulk of

[40] The set of English speaking countries is described in the Data Appendix.

human capital accumulation is still likely to occur on-the-job. If trade increases on-the job human capital accumulation, its role in generating growth is likely to be more important than generally considered.

Tables

Table II.1. Descriptive Sample Statistics

	1980 Census		1990 Census	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Log of Annual Earnings	9.346	0.754	9.757	0.852
Experience	23.736	10.377	24.656	10.678
Experience US	8.884	5.220	11.493	7.406
Education				
Years of Education	10.108	5.180	10.022	5.362
Grade less than 5	0.150	0.357	0.174	0.379
Grade 5 to 8	0.258	0.438	0.194	0.395
Grade 9	0.040	0.196	0.044	0.206
Grade 10 to 11	0.070	0.256	0.100	0.300
Grade 12 and GED	0.195	0.396	0.153	0.360
Some College	0.024	0.154	0.096	0.294
Associate Degree	0.073	0.260	0.042	0.200
Bachelor's Degree	0.109	0.312	0.106	0.308
Master's Degree	0.025	0.156	0.048	0.214
Professional/Doctoral	0.055	0.227	0.043	0.202
Region				
Pacific	0.348	0.476	0.384	0.486
Mid Atlantic	0.260	0.438	0.213	0.410
East North Central	0.115	0.319	0.078	0.268
West North Central	0.013	0.114	0.010	0.101
South Atlantic	0.079	0.269	0.118	0.323
East South Central	0.005	0.072	0.005	0.071
West South Central	0.084	0.278	0.101	0.301
Mountain	0.031	0.173	0.036	0.187
New England	0.065	0.247	0.054	0.226
Year of Immigration				
1960-64	0.142	0.349	0.052	0.222
1965-69	0.224	0.417	0.090	0.286
1970-74	0.304	0.460	0.141	0.348
1975-80	0.330	0.470	0.185	0.389
1980-81	0.000	0.000	0.137	0.343
1982-84	0.000	0.000	0.126	0.332
1985-86	0.000	0.000	0.120	0.325
1987-90	0.000	0.000	0.149	0.356
Others				
Married (Spouse Present)	0.776	0.417	0.685	0.464
English (Only or Very well)	0.379	0.485	0.396	0.489
Disability	0.023	0.148	0.025	0.155
SMSA	0.913	0.282	0.910	0.286
# Observations	58695		114442	

Base dummies are Grade 12 and GED for education, Pacific for region and 1960-64 for year of immigration. For variable description, see Data Appendix.

Table II.2. Earnings Regression

Census	1980		1990		1980/1990	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Grade less than 5	-0.288***	0.051	-0.351***	0.033	-0.351***	0.033
Grade 5 to 8	-0.172***	0.033	-0.270***	0.02	-0.270***	0.02
Grade 9	-0.147***	0.021	-0.211***	0.023	-0.212***	0.023
Grade 10 to 11	-0.059***	0.016	-0.134***	0.014	-0.134***	0.014
Some College	0.091***	0.025	0.129***	0.017	0.129***	0.017
Associate Degree	0.156***	0.023	0.240***	0.026	0.241***	0.026
Bachelor's Degree	0.375***	0.059	0.444***	0.074	0.444***	0.074
Master's Degree	0.471***	0.04	0.624***	0.042	0.624***	0.041
Profess./Doctoral	0.617***	0.025	0.777***	0.027	0.777***	0.027
Exp	0.024***	0.004	0.022***	0.004	0.023***	0.004
Exp2 / 100	-0.046***	0.007	-0.041***	0.007	-0.043***	0.007
ExpUS	0.041***	0.009	0.036***	0.009	0.036***	0.008
ExpUS2/100	-0.102***	0.027	-0.073***	0.016	-0.075***	0.014
Exp*ExpUS	0.018	0.013	0.017	0.013	0.018	0.013
Married	0.252***	0.013	0.272***	0.016	0.272***	0.015
English	0.203***	0.046	0.199**	0.044	0.199***	0.044
Disabled	-0.245***	0.033	-0.277**	0.031	-0.277***	0.031
SMSA	0.045	0.036	0.077**	0.019	0.077***	0.019
Mid Atlantic	0.002	0.036	0.129***	0.039	0.129***	0.039
East North Central	0.192***	0.022	0.113***	0.024	0.113***	0.024
West North Central	0.134***	0.046	-0.010	0.035	-0.010	0.034
South Atlantic	0.001	0.024	-0.021	0.033	-0.022	0.032
East South Central	0.140**	0.059	0.076	0.057	0.076	0.057
West South Central	-0.007	0.021	-0.173***	0.017	-0.173***	0.017
Mountain	-0.004	0.031	-0.114***	0.016	-0.114***	0.016
New England	0.118***	0.037	0.224***	0.05	0.224***	0.05
1980					-0.447	0.092
Constant	8.435***	0.052	8.835***	0.067	8.826***	0.059
Adjusted R-Square	0.253		0.313		0.333	
# Observations	58695		114442		173137	

Dependent variable is the log of annual earnings. Regression using 1980 and 1990 Censuses includes interaction terms between the 1980 dummy and all other dummies. Standard errors account for heteroscedasticity and clustering within country of origin. Double asterisk denotes statistical significance at the 5-percent level and triple at the 1-percent level.

Table II.3. Earnings Regression and Openness

	OLS	Fixed Effect	Constrained
Exp	0.034***	0.025***	0.024***
	(0.004)	(0.001)	(0.001)
Exp2 / 100	-0.039***	-0.039***	-0.027***
	(0.007)	(0.002)	(0.001)
ExpUS	0.028***	0.027***	0.02***
	(0.008)	(0.001)	(0.001)
ExpUS2/100	-0.059***	-0.046****	-0.100***
	(0.012)	(0.005)	(0.005)
Exp*ExpUS/100	0.005	-0.014***	0.053***
	(0.011)	(0.004)	(0.003)
Exp*log RealOpen	0.006***	0.002***	0.006***
	(0.001)	(0,000)	(0,000)
ExpUS*log RealOpen	-0.004***	-0.006***	-0.006***
	(0.001)	(0,000)	(0,000)
Constant	8.833***	8.814***	8.975***
	(0.057)	(0.014)	(0.012)
R-Square	0.344	0.313	
# Observations	171445	171445	171445

Dependent variable is the log of annual earnings. Regressions include dummies for year of education, marital status English speaking status, health status, SMSA, census division, 1980 and year of immigration, as well as interaction terms between the 1980 dummy and all other dummies. Standard errors are in parentheses. They account for heteroscedasticity and clustering within country of origin. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent, triple at the 1-percent level.

Table II.4. Estimated Returns to Home Country Experience

Country	Exp.	Std. Err.	Exp.^2	Std. Err.	# Obs.
Tunisia	0.173	0.255	-0.00433	0.00738	51
Singapore	0.101	0.069	-0.00213	0.00153	67
Norway	0.09***	0.026	-0.0012*	0.00067	198
Finland	0.089***	0.034	-0.00142**	0.00070	134
Japan	0.086***	0.007	-0.00132***	0.00021	2884
South Africa	0.085***	0.019	-0.0018***	0.00048	419
Tanzania	0.085	0.058	-0.00102	0.00134	78
Uganda	0.082	0.071	-0.00406	0.00245	80
Germany. West	0.082***	0.010	-0.00164***	0.00027	1750
Cyprus	0.082**	0.032	-0.00121*	0.00066	105
Malaysia	0.076***	0.025	-0.00112**	0.00050	205
Netherlands	0.075***	0.015	-0.0011***	0.00038	661
Denmark	0.074***	0.028	-0.00144**	0.00070	232
Saudi Arabia	0.068	0.056	0.00016	0.00132	84
Switzerland	0.067***	0.023	-0.00165***	0.00060	387
Canada	0.067***	0.006	-0.00121***	0.00013	4588
Belgium	0.066**	0.029	-0.00182**	0.00078	225
United Kingdom	0.066***	0.005	-0.00122***	0.00012	5866
Western Samoa	0.066*	0.035	-0.00146*	0.00079	141
Sweden	0.065***	0.023	-0.00113*	0.00068	300
Australia	0.062***	0.022	-0.00106**	0.00054	426
Ethiopia	0.052**	0.024	-0.00114*	0.00064	282
Sri Lanka	0.048	0.032	-0.00127*	0.00076	184
Israel	0.047***	0.014	-0.00077**	0.00032	953
Brazil	0.046***	0.012	-0.00066**	0.00030	782
Bulgaria	0.043	0.046	-0.00028	0.00099	130
Hungary	0.042**	0.019	-0.00046	0.00044	634
Malta	0.042	0.047	0.00005	0.00096	83
Ireland	0.041***	0.012	-0.00084***	0.00029	1164
Kenya	0.041	0.055	-0.00015	0.00147	129
France	0.039***	0.015	-0.00039	0.00044	864
Czechoslovakia	0.039**	0.017	-0.00075*	0.00039	608
Indonesia	0.039**	0.017	-0.0008*	0.00040	473
Egypt	0.039***	0.012	-0.00081***	0.00031	1178
Algeria	0.037	0.103	0.0009	0.00280	66
Italy	0.037***	0.005	-0.00061***	0.00009	5373
Nigeria	0.035	0.027	-0.00007	0.00080	385

Exp. is the estimated coefficient on experience and Exp2. on experience squared. Std. Err. refers to Standard Errors. The dependent variable is the log of annual earnings. The specification of the regression is described in the text. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple at the 1-percent level.

Table II.4. (continued) Estimated Returns to Home Country Experience

Country	Exp.	Std. Err.	Exp.^2	Std. Err.	# Obs.
Czechoslovakia	0.039**	0.017	-0.00075*	0.00039	608
Indonesia	0.039**	0.017	-0.0008*	0.00040	473
Egypt	0.039***	0.012	-0.00081***	0.00031	1178
Algeria	0.037	0.103	0.0009	0.00280	66
Italy	0.037***	0.005	-0.00061***	0.00009	5373
Nigeria	0.035	0.027	-0.00007	0.00080	385
Morocco	0.034	0.038	-0.00007	0.00101	207
Turkey	0.034***	0.012	-0.00065****	0.00025	575
Taiwan	0.034***	0.009	-0.00046**	0.00021	1728
Iran	0.032***	0.010	-0.0005**	0.00021	1644
Bolivia	0.032*	0.019	-0.00066	0.00044	298
Argentina	0.031***	0.010	-0.00048**	0.00022	1383
Thailand	0.030*	0.016	-0.00088**	0.00040	609
New Zealand	0.027	0.032	-0.00037	0.00085	216
Hong Kong	0.027**	0.012	-0.00069**	0.00028	742
Greece	0.027***	0.007	-0.00045***	0.00014	2695
Korea. Rep.	0.027*	0.016	-0.00054	0.00035	640
Dominican Rep.	0.022***	0.005	-0.00041***	0.00010	3150
Bahamas	0.021	0.040	0.00005	0.00090	108
Portugal	0.021***	0.004	-0.00046***	0.00008	3985
Peru	0.021***	0.008	-0.00047***	0.00017	1661
Chile	0.021	0.013	-0.00038	0.00030	769
India	0.020***	0.005	-0.0005***	0.00011	5871
Belize	0.019	0.022	-0.00036	0.00040	241
Ecuador	0.018**	0.007	-0.0003**	0.00015	1750
Colombia	0.018***	0.005	-0.00035***	0.00011	3258
Barbados	0.018	0.014	-0.00058**	0.00029	509
Haiti	0.017***	0.006	-0.00028**	0.00012	2484
China	0.017***	0.004	-0.00031***	0.00007	5960
Yugoslavia	0.017**	0.008	-0.00026	0.00016	1873
Puerto Rico	0.016***	0.005	-0.00026**	0.00012	3877

Exp. is the estimated coefficient on experience and Exp2. on experience squared. Std. Err. refers to Standard Errors. The dependent variable is the log of annual earnings. The specification of the regression is described in the text. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple at the 1-percent level.

Table II.4. (continued) Estimated Returns to Home Country Experience

Country	Exp.	Std. Err.	Exp.^2	Std. Err.	# Obs.
Mexico	0.016***	0.001	-0.00028***	0.00003	54610
Guatemala	0.015**	0.007	-0.00012	0.00013	2313
Poland	0.014**	0.006	-0.00026**	0.00012	3322
Romania	0.014	0.011	-0.00042*	0.00024	938
Costa Rica	0.013	0.015	-0.00011	0.00032	422
Jamaica	0.012**	0.006	-0.00022**	0.00011	3355
Syria	0.011	0.017	-0.00028	0.00032	429
Philippines	0.010***	0.003	-0.00036***	0.00006	10085
Uruguay	0.010	0.019	-0.00021	0.00040	381
Ghana	0.009	0.035	-0.00088	0.00087	252
Guyana	0.008	0.010	-0.00015	0.00019	1075
Jordan	0.006	0.024	-0.00016	0.00053	300
El Salvador	0.006	0.005	-0.00013	0.00009	4419
Austria	0.006	0.028	0.00037	0.00082	309
Trinidad & Tobago	0.005	0.010	-0.00001	0.00022	1183
Pakistan	0.004	0.011	0.00013	0.00028	1150
Spain	0.004	0.011	-0.00032	0.00024	986
Cape Verde Islands	0.004	0.022	-0.00007	0.00038	173
Iraq	0.003	0.015	0.00042	0.00031	553
U.S.S.R.	0.003	0.008	0.0001	0.00017	2197
Honduras	0.003	0.012	0.00000	0.00026	861
Panama	0.002	0.015	-0.00017	0.00034	575
Myanmar	0.001	0.022	0.00008	0.00045	284
Nicaragua	-0.003	0.008	0.00006	0.00017	1272
Bangladesh	-0.004	0.023	0.00033	0.00051	289
Fiji	-0.004	0.020	0.00002	0.00038	239
Venezuela	-0.007	0.027	0.00036	0.00063	273
Paraguay	-0.032	0.062	0.00038	0.00160	75
Yemen	-0.037	0.045	-0.00004	0.00079	86
Liberia	-0.037	0.075	0.00172	0.00200	77
Sierra Leone	-0.132	0.127	0.00443	0.00375	55

Exp. is the estimated coefficient on experience and Exp2. on experience squared. Std. Err. refers to Standard Errors. The dependent variable is the log of annual earnings. The specification of the regression is described in the text. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple at the 1-percent level.

Table II.5. Standard Specification

	(I)	(II)	(III)	(IV)
A. All Countries				
Log Open	1.290***	0.927**	1.262***	0.830**
	(0.292)	(0.357)	(0.290)	(0.362)
Log GDP per Capita		0.663		0.722*
		(0.408)		(0.388)
Regional Dummies	No	No	Yes	Yes
R-Square	0.120	0.153	0.239	0.276
# Observations	93	93	93	93
B. Non-Oil Countries				
Log Open	1.222***	0.926**	1.189***	0.850**
	(0.287)	(0.363)	(0.286)	(0.372)
Log GDP per Capita		0.546		0.572
		(0.409)		(0.389)
Regional Dummies	No	No	Yes	Yes
R-Square	0.116	0.140	0.233	0.258
# Observations	87	87	87	87
C. Non-OECD/Non-Oil Countries				
Log Open	0.838**	0.887**	0.729**	0.830**
	(0.333)	(0.395)	(0.329)	(0.415)
Log GDP per Capita				0.275
				(0.446)
Regional Dummies	No	No	Yes	Yes
R-Square	0.060	0.061	0.107	0.138
# Observations	67	67	67	67

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent level, double at the 5-percent and triple at the 1-percent level.

Table II.6. Average Years of Schooling

	(I)	(II)	(III)	(IV)	(V)
A. All Countries					
Log Open	1.262***	0.910**	0.788*	0.796*	0.647
	(0.290)	(0.428)	(0.427)	(0.437)	(0.425)
Av. Yrs Schooling		0.334*	0.335*	0.211	0.048
		(0.180)	(0.195)	(0.212)	(0.317)
Log GDP per Capita				0.517	0.911
				(0.472)	(0.610)
Regional Dummies	Yes	No	Yes	No	Yes
R-Square	0.239	0.206	0.277	0.213	0.303
# Observations	78	78	78	78	78
B. Non-Oil Countries					
Log Open	1.189***	0.952**	0.853*	0.825*	0.677
	(0.286)	(0.447)	(0.446)	(0.437)	(0.430)
Av. Yrs Schooling		0.320	0.298	0.149	0.063
		(0.199)	(0.222)	(0.286)	(0.330)
Log GDP per Capita				0.647	0.854
				(0.623)	(0.658)
Regional Dummies	Yes	No	Yes	No	Yes
R-Square	0.233	0.202	0.28I	0.211	0.296
# Observations	74	74	74	74	74
C. Non-OECD/Non-Oil Countries					
Log Open	0.729**	0.905*	0.788*	0.822*	0.540
	(0.329)	(0.504)	(0.472)	(0.484)	(0.429)
Av. Yrs Schooling		0.065	0.093	-0.042	-0.167
		(0.296)	(0.295)	(0.389)	(0.423)
Log GDP per Capita				0.456	1.147
				(0.738)	(0.933)
Regional Dummies	Yes	No	Yes	No	Yes
R-Square	0.107	0.080	0.118	0.081	0.144
# Observations	54	54	54	54	54

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent level, double at the 5-percent and triple at the 1-percent level.

Table II.7. Share of Manufacturing and GADP

	(I)	(II)	(III)	(IV)	(V)
			A. All Countries		
Log Open	1.021**	0.821**	0.720**	0.465	0.833**
	(0.402)	(0.369)	(0.279)	(0.306)	(0.335)
Log GDP per Capita	0.783*	0.785*	-0.602	-0.055	-0.598
	(0.443)	(0.425)	(0.439)	(0.481)	(0.450)
Share Manufacture	0.054**	0.069**			0.028
	(0.027)	(0.028)			(0.026)
GADP			8.157***	7.747***	7.671***
			(1.624)	(1.714)	(1.468)
Regional Dummies	No	Yes	No	Yes	No
R-Square	0.222	0.291	0.300	0.343	0.333
# Observations	75	75	91	91	75
			B. Non-Oil Countries		
Log Open	0.988**	0.891**	0.740***	0.532*	0.897***
	(0.409)	(0.407)	(0.281)	(0.303)	(0.330)
Log GDP per Capita	0.821*	0.759*	-1.206***	-0.731	-1.026**
	(0.442)	(0.440)	(0.383)	(0.484)	(0.435)
Share Manufacture	0.048	0.063**			0.035
	(0.029)	(0.031)			(0.029)
GADP			10.325***	9.878***	9.374***
			(1.6434)	(1.841)	(1.623)
Regional Dummies	No	Yes	No	Yes	No
R-Square	0.218	0.315	0.334	0.363	0.346
# Observations	72	72	85	85	72
			C. Non-OECD/Non-Oil Countries		
Log Open	0.954**	0.771*	0.739**	0.512*	0.816**
	(0.451)	(0.428)	(0.291)	(0.312)	(0.331)
Log GDP per Capita	0.251	0.898*	-1.224***	-0.734	-0.980**
	(0.543)	(0.516)	(0.394)	(0.501)	(0.465)
Share Manufacture	0.048	0.064			0.012
	(0.039)	(0.040)			(0.036)
GADP			10.363	10.131***	10.196***
			(2.188)	(2.401)	(2.093)
Regional Dummies	No	Yes	No	Yes	No
R-Square	0.048	0.208		0.271	0.24
# Observations	53	53		65	53

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent level, double at the 5-percent and triple at the 1-percent level.

Table II.8 Investment per Worker

	(I)	(II)	(III)	(IV)	(V)	(VI)
			A. All Countries			
Log Open	0.773*	0.310	0.819**	0.547	0.558*	0.187
	(0.402)	(0.384)	(0.399)	(0.402)	(0.332)	(0.351)
Log Inv. Per Worker	0.828**	1.506***	1.218	1.835	0.138	0.674
	(0.401)	(0.483)	(1.061)	(1.124)	(0.494)	(0.529)
Log GDP per Capita			-0.646	-1.430		
			(1.313)	(1.326)		
GADP					6.100***	4.558**
					(1.565)	(1.919)
Regional Dummies	No	Yes	No	Yes	No	Yes
R-Square	0.241	0.384	0.246	0.387	0.332	0.381
# Observations	82	82	82	82	82	82
			B. Non-Oil Countries			
Log Open	0.773*	0.330	0.829**	0.585	0.583*	0.340
	(0.407)	(0.390)	(0.405)	(0.408)	(0.335)	(0.339)
Log Inv. Per Worker	0.840**	1.493***	1.278	1.877*	0.099	0.907
	(0.405)	(0.484)	(1.074)	(1.131)	(0.535)	(0.717)
Log GDP per Capita			-0.727	-1.525		
			(1.341)	(1.349)		
GADP					6.303***	4.707*
					(1.917)	(2.430)
Regional Dummies	No	Yes	No	Yes	No	Yes
R-Square	0.250	0.377	0.256	0.384	0.330	0.399
# Observations	78	78	78	78	78	78
			C. Non-OECD/Non-Oil Countries			
Log Open	0.636	0.378	0.767*	0.471	0.542	0.381
	(0.431)	(0.437)	(0.445)	(0.442)	(0.354)	(0.409)
Log Inv. Per Worker	0.638	1.192**	1.831*	2.150*	0.131	0.899
	(0.492)	(0.576)	(1.071)	(1.192)	(0.559)	(0.748)
Log GDP per Capita			-2.345	-1.940		
			(1.424)	(1.485)		
GADP					6.772***	2.949
					(2.061)	(3.364)
Regional Dummies	No	Yes	No	Yes	No	Yes
R-Square	0.137	0.287	0.199	0.328	0.212	0.297
# Observations	58	58	58	58	58	58

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Standard errors are in parentheses and calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple at the 1-percent level.

Table II.9. Imports and Exports per Worker

	(I) 1970	(I) 1975	(I) 1980	(II) 1970	(II) 1975	(II) 1980
	A. Non-Oil Countries					
Log Open	1.157***	1.141***	1.141***	0.743**	0.755**	0.891***
	(0.413)	(0.363)	(0.363)	(0.353)	(0.330)	(0.331)
Log Imports per Worker	0.569*	0.601**	0.773**	0.301	0.587**	0.591
	(0.299)	(0.315)	(0.298)	(0.284)	(0.332)	(0.388)
Log MNF Imp from OECD	0.484	0.564**	0.637**	0.209	0.493	0.457
	(0.307)	(0.319)	(0.277)	(0.243)	(0.312)	(0.322)
Log MNF Imp from Non-OECD	0.506**	0.356	0.594**	0.069	0.066	0.318
	(0.232)	(0.260)	(0.297)	(0.315)	(0.255)	(0.337)
Log of Computer Imp per Worker	0.437***	0.399***	0.520***	0.273	0.088	0.115
	(0.165)	(0.150)	(0.136)	(0.242)	(0.250)	(0.256)
Log Exports per Worker	0.690***	0.776***	0.842***	0.296	0.573**	0.807**
	(0.250)	(0.233)	(0.228)	(0.309)	(0.312)	(0.333)
Log MNF Exp to OECD	0.522***	0.559**	0.623***	0.339**	0.23	0.323
	(0.135)	(0.223)	(0.220)	(0.143)	(0.340)	(0.324)
Log MNF Exp to Non-OECD	0.520***	0.578**	0.794***	0.222	0.412	0.344
	(0.176)	(0.223)	(0.214)	(0.198)	(0.252)	(0.341)
# Observations	71	74	74	65	69	72
	C. Non-OECD/Non-Oil Countries					
Log Open	1.006**	1.019**	1.019**	0.618*	0.653**	0.841**
	(0.467)	(0.404)	(0.404)	(0.358)	(0.312)	(0.335)
Log Imports per Worker	0.473	0.521	0.733**	0.191	0.538	0.65
	(0.335)	(0.339)	(0.330)	(0.287)	(0.346)	(0.420)
Log MNF Imp from OECD	0.430	0.547	0.654**	0.173	0.551	0.590*
	(0.349)	(0.347)	(0.308)	(0.253)	(0.340)	(0.350)
Log MNF Imp from Non-OECD	0.406	0.209	0.496	-0.104	-0.133	0.195
	(0.259)	(0.293)	(0.333)	(0.381)	(0.284)	(0.370)
Log of Computer Imp per Worker	0.430**	0.366**	0.497***	0.117	0.115	0.344*
	(0.187)	(0.174)	(0.149)	(0.259)	(0.256)	(0.201)
Log Exports per Worker	0.546*	0.683**	0.771***	0.083	0.422	0.762**
	(0.304)	(0.270)	(0.258)	(0.335)	(0.309)	(0.354)
Log MNF Exp to OECD	0.464***	0.492**	0.575**	0.334**	0.235	0.384
	(0.151)	(0.217)	(0.219)	(0.155)	(0.388)	(0.371)
Log MNF Exp to Non-OECD	0.457**	0.505**	0.719**	0.146	0.322	0.323
	(0.196)	(0.240)	(0.243)	(0.209)	(0.276)	(0.379)
# Observations	52	55	55	46	50	53

Dependent variable is the estimated return to home country experience. All specifications include significant regional dummies. (II) additionally controls for log of GDP per capita, share of manufacturing and government antidiversion policy (GADP). Estimation technique is OLS. Standard errors are in parentheses and are calculated using the White estimator. MNF refers to manufacturing. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple at the 1-percent level.

Table II.10. Self-Selection

	Migration rate conditional on: age		education	
	(I)	(II)	(I)	(II)
A. All Countries				
Log Open	0.851**	0.742*	0.950**	0.473
	(0.424)	(0.453)	(0.416)	(0.314)
Log GDP per Capita	0.793**	-0.162	0.659	-0.655
	(0.375)	(0.406)	(0.596)	(0.482)
GADP		4.712***		8.767***
		(1.527)		(1.755)
Share Manufacture		0.047		0.044
		(0.032)		(0.032)
R-Square	0.388	0.458	0.226	0.438
# Observations	80	68	59	54
B. Non-Oil Countries				
Log Open	0.870**	0.651	0.963**	0.465
	(0.434)	(0.432)	(0.414)	(0.311)
Log GDP per Capita	0.670*	-0.956*	0.656	-0.688
	(0.383)	(0.505)	(0.591)	(0.486)
GADP		9.283***		8.935***
		(1.853)		(1.895)
Share Manufacture		0.040		0.045
		(0.032)		(0.033)
R-Square	0.371	0.437	0.223	0.432
# Observations	74	65	57	52
C. Non-OECD/Non-Oil Countries				
Log Open	0.800*	0.561	0.744*	0.224
	(0.470)	(0.465)	(0.428)	(0.305)
Log GDP per Capita	0.604	-0.924*	-0.152	-0.618
	(0.464)	(0.520)	(0.759)	(0.570)
GADP		9.402***		8.986***
		(2.477)		(2.595)
Share Manufacture		0.029		0.028
		(0.036)		(0.044)
R-Square	0.260	0.311	0.064	0.025
# Observations	55	47	38	34

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Migration rates are added as regressors in the first step regression. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple a the 1-percent level.

Table II.11. Returns to Experience, Education and English Proficiency

	OLS	Fixed Effects
Exp	0.022***	0.020***
	(0.003)	(0.001)
Interaction with Exp	0.019***	0.019***
	(0.005)	(0.002)
Exp2 / 100	-0.041***	-0.037***
	(0.006)	(0.002)
Interaction with Exp2/100	-0.046***	-0.042***
	(0.009)	(0.005)
R-square	0.688	0.320
# Observations	173137	173137

Dependent variable is the log of annual earnings. Regressions include dummies for year of education, marital status, English speaking status, health status, SMSA, census division, 1980 and year of immigration, as well as interaction terms between the 1980 dummy and all other dummies. All experience terms are interacted with a dummy that assumes value one if the individual has at least 12 years of education. Standard errors are in parentheses. They are robust and account for clustering within country of origin. Single asterisk asterisks denotes statistical significance at the 10-percent, double at the 5-percent, triple at the 1-percent level.

Table II.12. Returns to Experience and Education

	Highly skilled (I)	Low skilled (II)	Home country skill distribution (III)	US immigrants skill distribution (IV)
		A. All Countries		
Log Open	0.929**	0.953	0.909**	0.855*
	(0.430)	(0.877)	(0.413)	(0.437)
Log GDP per Capita	-1.071*	-0.349	-1.123**	-0.895
	(0.562)	(1.035)	(0.532)	(0.586)
GADP	6.087***	7.068*	6.468***	5.874***
	(2.250)	(3.878)	(1.712)	(1.554)
Share Manufacture	0.069**	0.046	0.066**	0.074**
	(0.031)	(0.058)	(0.031)	(0.031)
R-Square	0.484	0.176	0.588	0.573
# Observations	66	66	66	66
		B. Non-Oil Countries		
Log Open	0.905**	1.159	0.867**	0.760*
	(0.444)	(0.884)	(0.413)	(0.433)
Log GDP per Capita	-1.104	-1.137	-1.280**	-0.931
	(0.711)	(1.186)	(0.631)	(0.736)
GADP	6.243*	9.999**	7.379***	7.234***
	(3.330)	(4.547)	(2.550)	(2.527)
Share Manufacture	0.073**	0.062	0.064**	0.063*
	(0.033)	(0.059)	(0.031)	(0.035)
R-Square	0.538	0.202	0.586	0.573
# Observations	63	63	63	63
		C. Non-OECD/Non-Oil Countries		
Log Open	0.281	0.427	0.443	0.199
	(0.437)	(0.974)	(0.390)	(0.402)
Log GDP per Capita	-0.840	-0.627	-8.779	-0.478
	(0.699)	(1.060)	(0.667)	(0.680)
GADP	9.305***	11.498*	5.694**	6.485**
	(2.206)	(5.837)	(2.295)	(2.448)
Share Manufacture	-0.038	-0.034	0.041	0.014
	(0.033)	(0.091)	(0.035)	(0.035)
R-Square	0.291	0.115	0.462	0.462
# Observations	44	44	44	44

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple a the 1-percent level.

Table II.13. Returns to Experience and English speaking Origin

	English not widely spoken (I)	English widely spoken (II)
	A. All Countries	
Log Open	1.180**	1.372**
	(0.533)	(0.510)
Log GDP per Capita	0.025	-2.094**
	(0.429)	(0.829)
GADP	2.718*	13.372***
	(1.602)	(2.666)
Share Manufacture	0.053	0.147**
	(0.037)	(0.070)
R-Square	0.536	0.524
# Observations	51	24
	B. Non-Oil Countries	
Log Open	1.180**	1.372**
	(0.547)	(0.510)
Log GDP per Capita	0.333	-2.094**
	(0.636)	(0.829)
GADP	1.176	13.372***
	(2.907)	(2.666)
Share Manufacture	0.053	0.147**
	(0.039)	(0.070)
R-Square	0.530	0.524
# Observations	48	24
	C. Non-OECD/Non-Oil Countries	
Log Open	1.209**	1.630**
	(0.549)	(0.634)
Log GDP per Capita	1.002	-2.578**
	(0.668)	(1.131)
GADP	-0.634	11.725***
	(3.232)	(2.715)
Share Manufacture	0.074*	0.185*
	(0.040)	(0.099)
R-Square	0.547	0.541
# Observations	34	19

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. All specifications include significant regional dummies. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple a the 1-percent level.

Table II.14. Without Experience in Home Country

	(I)	(II)	(III)	(IV)
		A. All Countries		
Log Open	0.012	0.125	0.531	0.021
	(0.630)	(0.655)	(0.617)	(0.776)
Regional Dummies	No	Yes	Yes	Yes
R-Square	0.000	0.168	0.184	0.192
# Observations	70	70	70	58
		B. Non-Oil Countries		
Log Open	-0.014	0.932	0.475	0.0093
	(0.635)	(0.660)	(0.625)	(0.780)
Regional Dummies	No	Yes	Yes	Yes
R-Square	0.000	0.109	0.122	0.109
# Observations	66	66	66	58
		C. Non-OECD/Non-Oil Countries		
Log Open	0.080	0.192	0.574	-0.014
	(0.810)	(0.764)	(0.727)	(0.776)
Regional Dummies	No	Yes	Yes	Yes
R-Square	0.000	0.118	0.133	0.117
# Observations	50	50	50	40

Dependent variable is the estimated return to home country experience in percent. Estimation technique is OLS. All specifications include significant regional dummies. (III) controls additionally for GDP per capita and (IV) GADP and Share of Manufacturing. Standard errors are in parentheses and are calculated using the White estimator. Single asterisk denotes statistical significance at the 10-percent, double at the 5-percent and triple a the 1-percent level.

Figure II.1 Log Earnings/Experience Profile

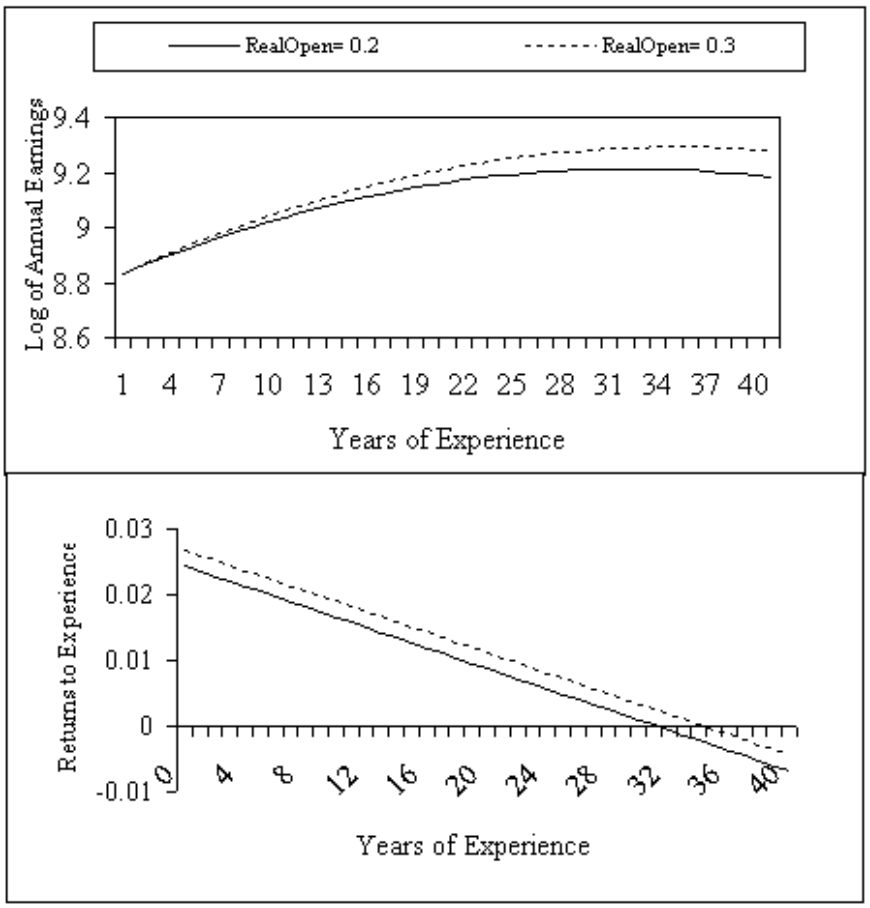
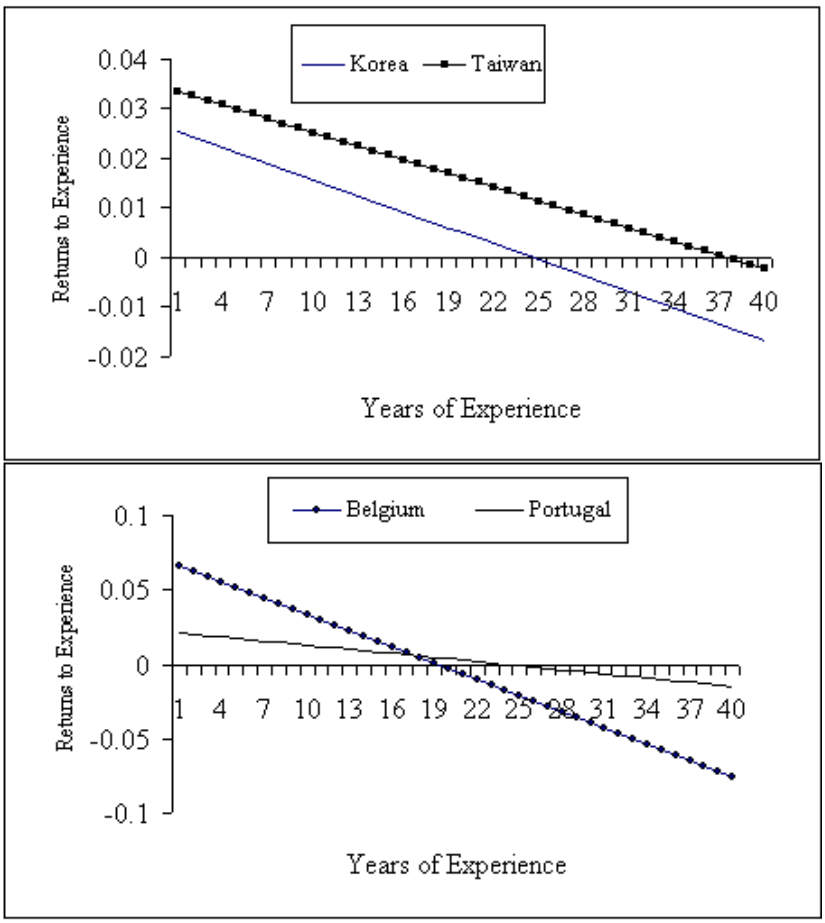


Figure II.2. Returns to Experience and Years of Experience



Appendix

Sample Selection Criteria

The analysis is based on a sample drawn from the 5/100 public-use micro data files of the US Censuses of Population of 1980 and 1990.[41] The sample is restricted to male US immigrants who are between 25 and 64 years old, worked and earned at least $1000 wage or salary income in the year preceding the census and were not enrolled in school at the time of the census. Furthermore, immigrants in the sample arrived to the US after 1959 and completed their education in their home country. The latter restriction is motivated by the fact that both censuses provides only information on the highest educational degree obtained. It is hence impossible to identify years of experience in the home country for immigrants who acquired US schooling.

The censuses provides information on the year of immigration only within brackets of varying width. Following Bratsberg and Ragan (2002), Bratsberg and Terrell (2002) and Chiswick and Miller (2002) an immigrant is included in the sample if $(6+ \; years \; of \; education)$ is lower than his age at the lower bound of the year of immigration bracket. This restriction ensures that no immigrant who acquired US schooling enters the sample. These sample selection criteria leave a total sample of 173137 observations, of which 58695 belong to the 1980 census and 114442 to the 1990 census. Descriptive statistics of the full sample are presented in table $II.1$.

The sample size reduces to 171445 observations when matching the census data with the Penn World Tables Mark 5.6 as some countries do not report information on openness.

Variable Description

Census Variables

The dependent variable of the wage regression is the natural logarithm of the annual wage or salary income in 1979 or 1989. Years of schooling in the 1980 census are based on the "Highest Year of Schooling Attended". If the respondent did not complete the highest grade attended, one year is subtracted. The rule used to convert educational attainment to years of schooling in the 1990 census is the same as in Bratsberg and Terrell (2002). Experience is defined as $(age - years \; of \; schooling - 6)$. Experience in the US is calculated with respect to the middle of the year of immigration bracket.

Macroeconomic Variables

Variables necessary to calculate the measure of GDP per capita, investment per worker and Open are taken from the Penn World Tables Mark 5.6 revision of Summers and Heston (1991). The measure of GDP is RGDPL, which is per capita GDP expressed in constant year international prices. Open is defined as imports plus exports in exchange rate US$ relative to GDP in purchasing-power-parity US$ and deflated by international export prices. This measure of openness has been proposed by Ciccone and Alcala (2004). Average educational attainment is measured for the population aged 25 and over, as

[41] The data are available online at http://www.ipums.org. For more information on the data, see Ruggles and Sobek (1997).

reported by Barro and Lee (2000). Data on pupil-teacher ratio and real public spending per student are from Lee and Barro (2001). Measures of cognitive skills are taken from Hanushek and Kim (1999).

The index of government antidiversion (GADP) is taken from Hall and Jones (1999). It is based on data from the International Country Risk Guide which rates 130 countries according to 24 categories. The GADP is defined as the equal-weighted average of five of these categories (law and order, bureaucratic quality, corruption, risk of expropriation and government repudiation of contracts) for the years 1986-1995. The index is measured from zero to one. The value of the index increases with the effectiveness of government policies in supporting an environment favorable to productive activities.

Data on the share of agriculture and manufacturing in GDP are taken from Caselli and Coleman (2001) and are based on data from the World Bank. Data on imports and exports are from Caselli and Coleman (2001), who take the original data from Feenstra, Lipsey and Bowen (1997).

Regional Dummies

Regional Dummies are defined for Africa, Asia, Latin America, Transition Economies and Island. Island includes the Caribbean and Pacific Island States, the African Island States in the Indian Ocean as well as Cape Verde, Malta and Cyprus. Hongkong, Taiwan and Singapore are added to the Asian dummy. Oil exporting countries are Iran, Iraq, Jordania, Saudi Arabia, Syria and Yemen. The base dummy consists of the OECD member countries as of 1990 plus Turkey and Israel.

English Speaking Countries

According to the World Factbook 2001 English is an official language in Australia, Bahamas, Barbados, Belize, Canada, Fiji, Ghana, Guyana, Hong Kong, Ireland, Jamaica, Kenya, Liberia, Malta, New Zealand, Nigeria, Philippines, Singapore, South Africa, Tanzania, Trinidad and Tobago, Uganda and the UK. Countries were English is an official language but used by a limited minority are Sierra Leone, India and Pakistan. Countries were English is not an official language but widely used within certain population groups applies to Jordania, Panama, South Korea and Western Samoa.

3 Natural Resources and Institutions

3.1 Introduction

The deleterious effect of natural resource rents on legal and government institutions may be the most pernicious mechanism through which the natural resource curse casts its spell. This curse corresponds to the wide-spread notion that natural resource abundance tends to harm economic development, reflected in policy discussions and supported by the empirical finding that resource abundant countries tend to grow less. It curse has been attributed to the Dutch disease, high volatility in government revenues and weak institutions. The last two problems can be tackled in theory by using a variety of economic policy instruments. The implementation of these policies, however, requires adequate institutions and political will.

Natural resources rents, if used wisely, can provide poor countries with a unique opportunity for development, as the United States clearly exemplify. Governmental and legal institutions have also been found to play a fundamental role for economic development[42]. Analyzing why natural resource rents weaken institutions may therefore not only enhance our understanding of the determinants of the natural resource curse, it also helps us to better understand the mechanisms that shape institutions. The theoretical literature identifies the nature of interactions between social groups as one essential determinant of institutions. Natural resource rents are likely to affect the nature of these interactions.

This chapter challenges the claim that natural resource rents and, in particular mineral and fuel rents, are generally detrimental to institutions. It provides empirical evidence that the partial correlation coefficient between institutional quality and various measures of mineral and fuel abundance turns insignificant when introducing minor changes to standard specifications. More importantly, this analysis provides empirical evidence that the effect of natural resources on institutional quality depends significantly on ethnic fractionalization. Size and significance of the interaction term between various natural resource measures and ethnic fractionalization is robust to a variety of specification. The marginal effect on institutional quality differs, however, among natural resource measures. Economies that relief heavily on oil and fuel exports in the past tend to have a significantly lower quality of institutions today if ethnic fractionalization is high. To the contrary, high mineral and fuel rents per capita and a high share of food and agricultural exports in exports or GDP are positively associated with institutional quality when ethnic fractionalization is low.

The theoretical literature suggests, in general, that natural resources erode a country's quality of policies and institutions, focusing on three mechanisms. Large natural resource rents could first, potentially breed rent-seeking activities (Gelb, 1998); second, weaken accountability and inhibit the establishment of democratic rule (Putnam, 1993; Inglehart, 1997; Isham, et al. 2003); and third, increase the likelihood of civil conflict (Collier and Hoeffler, 2001; Ross, 2001). Similar to natural resource rents, ethnic fractionalization tends to weaken institutions according to the theoretical literature. The main argument is that ethnic fractionalization may lead to uncoordinated rent-seeking activities where

[42] See for example, Knack and Keefer, 1995; Acemoglu, et al., 2000 and Hall and Jones, 1999.

each ethnic group does not take into consideration the effect of one's groups actions on the rents of the other group (Easterly and Levine, 1997). Moreover, it may weaken the centralization of control and useful checks and balances (Alesina and Rodrik, 1994; Alesina, Baqir, Easterly, 1999), facilitating rent-seeking activities, weakening accountability and opening the door for corruption.

Although similar arguments have been proposed to explain the deleterious effect of both natural resource rents and ethnic fractionalization on institutional quality, only few theoretical studies propose that natural resource abundance in combination with ethnic fractionalization may lead to worse political outcomes. Tornell and Lane (1999) argue that the interaction of powerful groups competing for natural resource rents may provoke that windfall gains cause a "feeding frenzy", possibly impeding the implementation of needed structural, growth-supporting reforms. Caselli and Coleman (2002) claim that ethnicity enables groups that fight over resources to enforce membership in the respective coalitions. Natural resource rents constitute the price that can be gained from engaging in conflict. They conclude that civil conflict is most likely to occur if the cost of changing the characteristics that distinguish a group are high and if natural resource rents assume intermediate values. The latter arises from the fact that a small price is not worth the cost of conflict. A very large price implies that members of the defeated group switch identity in large numbers.

This study is not alone in analyzing the effect of natural resource rents on institutions empirically. Contrary to the findings presented in this chapter, previous empirical evidence tends to support the hypothesis that institutions in resource abundant countries are on average weaker than in resource poor countries. Countries with a high level of natural resource exports are more corrupt (Leite and Weidmann, 1999), have a weaker rule of law and worse political institutions across the board (Sachs and Warner, 1995a; Isham, et al., 2003; Sala-i-Martin and Subramanian, 2003). They are less likely to be democratic (Ross, 1999; Djankov, Montalvo, Reynal-Querol, 2005) and face a higher probability of civil conflict (Collier and Hoeffler, 2001; Ross, 2001).[43]

The main novelty in the present chapter is that it shows by means of a variety of robustness checks that natural resources are on average not negatively associated with institutional quality. The effect of some natural resource measures, however, becomes significantly negative if ethnic fractionalization increases. Contrary to the predictions derived from Caselli and Coleman (2002), the marginal effect of ethnic fractionalization on institutional quality becomes, however, increasingly negative and statistically significant with mineral and fuel abundance. This finding is robust to a variety of econometric specifications. Substituting ethnic fractionalization with a measure of ethnic polarization does not alter the main findings.

Moreover, this chapter clearly identifies a robust, negative relation between institutional quality and ethnic fractionalization in countries rich in mineral and fuel resources. So far, empirical evidence regarding the relation between ethnic fractionalization and in-

[43] Stijns (2001a) estimates the (partial) linear correlations between oil, gas, coal and mineral reserves and different variables of the political infrastructure and finds no conclusive evidence of as significant negative correlation. However, since he does not control for other variables, that are likely to be positively correlated with institutions and natural resources, such as for example openness or GDP, his estimates are likely to be upward biased.

stitutional quality has been far from conclusive. In general, the statistical significance of the coefficient of ethnic fractionalization in studies investigating the determinants of quality of institutions hinges upon the set of control variables and this coefficient often turns statistically insignificant when controlling for GDP per capita or latitude. (see, La Porta, et al.,1999; Alesina, et al. ,2002). Easterly and Levine (2003) reach the conclusion that ethnic fractionalization explains a significant part of political instability and that ethnic fractionalization in 1960 is significantly correlated with a measure of corruption and democracy in 1990. They neither control for GDP per capita, regional dummies or latitude. Contrary to these studies, the results presented in this chapter are robust to the econometric specification.

The remaining part of this chapter is organized as follows. Next, I provide a description of the data and descriptive statistics. Section 3 discusses the effect of natural resource rents on institutional quality, while section 4 refers to aid. The final section concludes.

3.2 Specifications and Correlations

This chapter assesses the question whether natural resources have a negative effect on the quality of institutions. The starting point for the empirical analysis is the following linear regression:

$$RuleLaw = c_o + c_1 Resource + c_2 Ethnic + \beta X + u \tag{13}$$

RuleLaw is the average of the "Rule of Law" index taken over the years 1996, 1998, 2000 and 2002 from Kaufmann, Kraay and Zoido-Lobaton (2002). The "Rule of Law" index measures the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions. This index has been emphasized as a crucial determinant of economic performance (see, for example, Sala-i-Martin and Subramanian, 2003). It ranges from -1.352 for Haiti to 2.166 for Switzerland. Norway, Singapore and New Zealand also have a Rule of Law index exceeding 2.

Resource is a measure of natural resources. This chapter presents results using a variety of natural resource measures, such as natural capital exports as a share of merchandise exports and GDP, mineral and fuel exports per capita or mineral and fuel rents per capita. Natural capital exports as a share of merchandise exports and GDP are standard measures of natural resource abundance, used in previous studies analyzing the effect of natural resources on the quality of institutions or growth (Sachs and Warner, 1997; Leite and Weidman, 1999; Ross, 1999; Sala-i-Martin and Subramanian, 2003). Since different components of natural capital may have a different effect on institutional quality, the specifications in the present chapter do not only control for the aggregate natural capital measure, but also its components, i.e. fuel, mineral, agricultural and food exports. [44] The data is taken from the World Bank's World Development Indicators (2001).

Mineral and fuel rents may provide a more precise measure of the gains associated with the exploitation of mineral and fuel resources. Stijns (2001b) proposes this measure in a study that analyzes the effect of natural capital abundance on human capital accumulation. Mineral and fuel rents are calculated as the sum of energy and mineral rents per

[44] For an exact definition of the different components, see Data Appendix.

capita. They range from 0 to US$2.1 million in United Arab Emirates. Rents are defined as the product of unit resource rents and the physical quantities extracted. Unit resource rents equal the difference between the international market price and the average unit production costs. Energy covers crude oil, natural gas and coal. For crude oil, unit rents are calculated as the world price less lifting costs.[45] Minerals subsume bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, gold, and silver. Data from energy and mineral rents are drawn from the genuine savings series of the World Development Indicators (2002).[46]

Natural resource measures may differ along four dimensions: the degree of aggregation of the natural resource measure, the nature of earnings from mineral and fuel resources, their denominator and the year they where measured. First, disaggregating natural capital in its components is motivated by the fact that different components may exert a different effect on institutional quality. Engerman and Sokoloff (1997) claim that the type of crops grown determined the extent to which property rights were enacted. Where crops were grown on large plantation or in countries where mineral extraction was prevalent, elites were able to amass great personal fortunes, resisting reforms that would diversify the economy and diminish their influence. Auty (2000) argues that countries rich in so-called point resources, such as oil fields, minerals (e.g. cooper and diamonds) and plantation crops, tend to be dominated by factional and predatory oligarchic polities, which are expected to impede a strengthening of institutions. Isham, et al. (2003) provide empirical evidence that export concentration in point resources is strongly associated with weak public institutions. Leite and Weidmann (1999) establish the empirical regularity that fuels and ore exports as a share of GNP are inversely related to corruption, while the corresponding partial association with agriculture and food exports as a share of GDP is consistently positive. Sala-i-Martin and Subramanian (2003) confirm these findings, pointing out that only mineral and fuel resources, but not food and agricultural resources, create these massive rents leading to a deterioration of institutions.

If different components of natural capital have a different effect on institutional quality, decomposing natural capital is important, especially since the composition of natural capital varies substantially among countries. Among the countries with the highest share of natural capital exports are oil and mineral exporting countries, but also agricultural good exporters and countries with a more diversified exports base. As can be seen in figure 1, countries with a high share of fuel and mineral exports in total exports, such as Bahrein, Brunei, Saudi Arabia, Venezuela and Indonesia, are among the countries with the highest share of natural capital exports in total merchandise exports. But also countries that rely heavily on the export of agricultural goods, for example Somalia and Sudan[47], have a high share of natural capital exports in total merchandise exports. Niger and Ghana are characterized by mixed export structure, exporting uranium (Niger) and gold and aluminium (Ghana), but also agricultural products such as cocoa and cotton.

Second, measures of mineral and fuel abundance differ in the nature of earnings from mineral and fuel resources. Natural resource rents may provide a more precise measure

[45] For the calculation of these variables, see Hamilton and Clemens (1999, 2002) and Kunte, et al. (1998).

[46] Due to data issues, rents from diamonds are not included in the data.

[47] Sudan started to export oil in 2000.

of the gains associated with the exploitation of natural resources than natural resource exports for three reasons. First, extraction costs vary widely among countries. Second, mineral and fuel exports are likely to be relatively low in countries with a high domestic energy consumption. The United States, for example, rank 12 with respect to mineral and fuel rents per capita, but only 45 with respect to mineral and fuel exports as a share of population. Third, the export variable may assign high values to transshipment hubs. Singapore and the Bahamas, for example, figure among the countries with the highest share of mineral and fuel exports per capita, but their mineral and fuel rents per capita are zero. Zero rents reflect the fact that neither country possesses oil, gas or other mineral fields, while their high share of mineral and fuel exports in total exports reflects their role as major transshipment hubs in the 1980s.

The third dimension of natural of resource measures explored in this study is the denominator. Natural resource measures are either expressed in terms of exports or GDP on the one hand or population on the other hand. When comparing natural resource exports to exports and GDP, the economic importance of natural resource exports in the economy is captured. Natural resource measures expressed in per capita terms provide information about the rents available in the economy and may be more closely linked to the political economy arguments presented above.

Last, natural resources may be measured at different points in time. When analyzing the effect of natural resources on today's quality of institutional, it may be recommendable to use past measures of natural resource abundance. Countries with weak institutions tend to be more prone to policy failures that may, for example, lead to a lack of export diversification or slow growth. Since GDP and exports today are likely to be determined by the current quality of a country's institutions, using current natural resources in terms of exports or GDP may create an issue of reverse causality. Not controlling for this reverse causality would lead to an overestimation of the negative effect of natural resources on institutions. To address this issue, measures of past natural resource abundance are used in the estimations.[48]

These difference among natural resource variables are reflected in the fact that their correlation coefficients, albeit positive, are not always statistically significant (table $II.2$). Among the four measures of mineral and fuel abundance, i.e. the share of mineral and fuel exports in exports (MFuelXX80), in GDP (MFuelXGDP80), per capita (MFuelP80) and energy and mineral rents (Rent80) the correlation coefficient is positive and significant. Natural capital measures are also positively correlated with measures of mineral and fuel abundance, but their correlation coefficient is not always statistically significant at the five percent significance level. Correlation is highest among natural capital exports to GDP and the share of mineral and fuel exports in GDP. The latter is also highly correlated with mineral and fuel exports per capita. The correlation between the share of food and agricultural exports in exports and measures of mineral and fuel abundance are negative and significant. Food and agricultural shares are not significantly correlated with measures of natural capital.

[48] Natural resource measures expressed in per capita terms are less likely to suffer from this issue of reverse causality. And even if institutions determined population growth, one would expect population growth to be lower in countries with stronger institutions, leading to an underestimation of the negative effect of natural resources on institutions.

Contrary to what the hypothesis of the natural resource curse might suggest, the correlation coefficients between Rule of Law and most natural resource measures are not statistically significant. The only exceptions are the share of natural capital exports in merchandise exports (NatCapXX80) and the export share of food and agricultural exports (FdAgXX80). It is particularly noteworthy that none of the measures of mineral and fuel abundance is significantly correlated with institutional quality.

Ethnic is measured by the index of ethnic fractionalization taken from Alesina, et al. (2002). It is constructed as an Herfindahl index, reflecting the probability that two randomly selected individuals from a population belong to different groups and defined as

$$Ethnic = 1 - \sum_{i=1}^{N} s_i$$

where s_i is the share of group i with respect to the total population.

For a given number of groups, the ethnic fractionalization index is maximized if different groups have equal size. Given equal group size the index increases with the number of different ethnic groups in a country.

As pointed out above, several theoretical arguments suggest a negative association between ethnic diversity and the quality of institutions. Consistent with this hypothesis, the simple correlation coefficient between ethnic diversity, as measured by ethnic fractionalization and Rule of Law reveals a significant negative correlation. Ethnic fractionalization is also negatively correlated with GDP in 1970, which may be interpreted as a proxy for past institutional quality. It is positively associated with the share of natural capital (NCapXX80) and mineral and fuel exports in exports (MFuelXX80), but not significantly correlated with all other measures of natural resource abundance. Descriptive statistics of the data as well as the description of all variables can be found in the appendix.

The set of control variables X includes initial GDP per capita, past enrollment rates, volatility of terms of trade, a country's share of English and European language speakers, latitude and regional dummies. Initial GDP per capita rather than current GDP per capita is used since current GDP per capita is likely to be significantly and positively associated with Rule of Law. If resource abundance reduces government performance and if bad governments have lower levels of income, controlling for present GDP in the regression may induce an underestimation of the coefficient of natural resource rents on governmental quality. To circumvent this issue, past GDP per capita is included in all regressions. Openness is not included in the core specification, but specifications controlling for openness will be discussed below. These control variables are standard in the literature.[49] The choice of using a standard set of control variables as a starting point is motivated by the fact that it facilitates comparisons with previous studies, thereby allowing to identify the key components that determine the results. Source and definition of all control variables is provided in the Data Appendix.

[49] See for example, Sala-i-Martin and Subramanian (2003) and Isham et al. (2003).

3.3 Natural Resources and Institutional Quality

The first question that this chapter addresses is whether natural resources have a negative effect on the quality of institutions. The empirical analysis presented in the section shows that the negative effect of natural resources on institutional quality is not robust, turning insignificant if previous econometric specifications are modified slightly. The econometric specifications presented below therefore relies on set of control variables set, standard in the literature, and a large set of natural resource measures to ensure comparability and robustness of the empirical results.

A previous empirical study analyzing the effect of natural resource abundance on institutional quality is Sala-i-Martin and Subramanian (2003). Differences between the estimated coefficients in the present study and their estimates arise from a change in the definition of institutional quality, the measure of GDP in the denominator of the natural resource shares expressed in terms of GDP and the measure of volatility of terms of trade. While this study uses the average of Rule of Law between 1996 and 2002 as dependent variable, Sala-i-Martin and Subramanian (2003) use the 2002 Rule of Law index as their measure of institutional quality. All measures of natural resources used in this study are either taken or calculated from data provided by the World Bank's World Development Indicators (WDI). Sala-i-Martin and Subramanian (2003) also take their measures of natural resources from WDI with the exception of the natural capital to GDP ratio, the latter being taken from Sachs and Warner (1995a). Volatility in terms of trade is measured here as the change in the log of external terms of trade between 1970 and 1990 taken from Sachs and Warner (1997), while Sala-i-Martin and Subramanian (2003) use the volatility in terms of trade between 1970 and 1998 weighted by the share of natural resource exports in GDP in 1970. Differences in the data imply that the sample size among the two data sets differs by two observations.[50]

Comparing the estimated coefficients in section A of table $III.3$ with those presented in Sala-i-Martin and Subramanian (2003)[51], it can be seen that they have the same signs and are comparable in terms of magnitude as well as significance level. In the core specification, the estimated coefficient of the share of natural resource exports in total exports amounts to -0.008 (standard error 0.004). This compares to a coefficient of -0.009 (standard error 0.004) presented in Sala-i-Martin and Subramanian (2003). The coefficients on fuel and mineral share in exports are identical.[52] Only the coefficients of natural resource shares expressed in terms of GDP are notably different to Sala-i-Martin and Subramanian's (2003). The coefficient on natural resources as a share of GDP amounts to -0.008 and is insignificant, while Sala-i-Martin and Subramanian obtain a significantly negative coefficient of -2.415 (standard error 0.595). By the same token, the coefficient of the share of mineral and fuel exports in GDP equals -0.017 (standard error 0.007) in table $III.3$ and compares to a coefficient of -2.587 (standard error 0.484) in the specification presented in Sala-i-Martin and Subramanian (2003).

These estimates confirm the hypothesis and previous empirical evidence that not all

[50] Isham, et. al. (2003) divide natural resources in "point sources" and "diffuse sources". Their results are, therefore, not directly comparable with the coefficients of the core specifications

[51] See Panel B in tables 2 and 3 in Sala-i-Martin and Subramanian (2003).

[52] The standard error on the share of mineral and fuel exports in total exports is 0.009 in the study of Sala-i-Martin and Subramanian (2003).

natural resources exert a deleterious effect on institutional quality. While the coefficients on mineral and fuel exports as a share of exports and GDP are significantly negative, the coefficients on agriculture and food exports as a share of exports and GDP are insignificant. The null hypothesis of equal coefficients of mineral and fuel exports as a share of GDP and agricultural and food exports as a share in GDP can be rejected.[53]

Apart from measures of natural resources, GDP per capita in 1970, secondary school enrollment in 1960, density of population in coastal areas in 1965 and the fraction of population speaking English or other European languages are significantly associated with Rule of Law according to the empirical results. With the exception of past enrollment rates, these variables capture various dimension of past institutional quality. Given that institutions tend to change only slowly, past GDP per capita is highly correlated with current institutional quality. Density of population in coastal areas in 1965 and the fraction of population speaking English or other European languages is claimed to capture Western European influence.[54] The fact that past enrollment rates are significantly associated with the current quality of institutions may capture the fact that past enrollment rates tend to entail a higher level of education, which is likely to affect the nature of interactions. Higher average educational attainment and literacy, in particular, can be assumed to affect the effectiveness of the judiciary and the use of written contracts in a society, thereby strengthening legal and governmental institutions.[55]

Adding ethnic fractionalization to the core specification, the coefficients of all natural resources measures become less negative and insignificant at the five percent significance level (table $III.3$, column B).[56] The coefficient of ethnic fractionalization has a negative sign and is not statistically significant at the five percent significance level across all natural resource measures. As discussed in the previous section, ethnic fractionalization has been identified in the theoretical and empirical literature as being detrimental to the quality of a country's institutions, leading to uncoordinated rent-seeking activities and weakening the centralization of control and useful checks and balances. As a consequence, it has been used as a control variable in previous studies that analyze the effect of natural resource abundance on institutional quality (see, Sala-i-Martin and Subramanian, 2003; Isham et al., 2003; Leite and Weidman, 1999). In none of these studies the coefficient on ethnic fractionalization is significant.

When adding latitude and regional dummies to the set of control variables, the coefficients on all natural resource measures, except of the share of food and agricultural

[53] Decomposing the components further into mineral, fuel, agriculture and food exports does not provide additional insights. Results are available upon request.

[54] For a discussion of the relation between institutional quality and the fraction of population speaking English or other European languagues or density of population in coastal areas in 1965, see Hall and Jones (1999) and Acemoglu, et al. (2000).

[55] Institutions and government, on the other hand, may provide an environment to individuals and firms that encourages the accumulation of skill. See, for example, Hall and Jones (1999).

[56] This reduction in the coefficients of natural resource measures confirms findings presented by Sala-i-Martin and Subramanian's (2003). When they add ethnic fractionalization to their core specification the coefficient on fuel and mineral exports as a share of GDP drops by more than one fifth. It remains, however, statistically significant at the one percent level. Sala-i-Martin and Subramanian (2003) do not present estimates of the share of fuel and mineral exports in exports when controlling for ethnic fractionalization.

exports in GDP, turn insignificant (table $III.3$,column C). Latitude, i.e. the absolute value of the latitude of the country, is strongly and positively correlated with Rule of Law. The coefficient on latitude may be interpreted to capture the effect of past institutions. Countries closer to the equator tend to have a more tropical climate, potentially representing an inhospitable environment according to Acemoglu, et al. (2001, 2002). They argue that colonial powers established extractive institutions in colonies with inhospitable climates. The main purpose of these extractive institutions was to transfer the maximum amount of resources from the colony to the colonial power by investing as little as possible at the same time. As a consequence, institutions in these colonies were not designed to protect private property nor to provide checks and balances against government expropriation. The authors claim that tropical endowments shaped colonial institutions which had long-run repercussions and still affect institutions today. Notwithstanding this strong association between latitude and institutional quality, none of the previous studies on the effect of natural resources on institutions or policies controlled for latitude.

Outliers could potentially lead to the erroneous conclusion of an insignificant relation between natural resources, in particular measures of mineral and fuel abundance, and institutional quality. To assess whether the finding of insignificant coefficients is the results of a specific data set, I substitute the log of real GDP using data from the World Bank's WDI. Some of the most oil rich economies, such as Saudi Arabia and Kuwait are not included in the data set by Sala-i-Martin and Subramanian (2003).[57] The change in the data set does not alter significantly the coefficients of measures of natural resources nor other significant control variables as can be seen in section A of table $III.4$. The most striking feature is the decrease in the coefficient on past enrollment rates which turns insignificant. The change in the data set leads, however, to a substantial improvement in the adjusted R-square. Similarly, controlling for outliers in section B of table $III.4$ does not alter the fact that none of the coefficients on measures of natural resource are statistically significant at the five percent level once latitude and regional dummies are included in the set of control variables. DFITS indicate that Singapore is, by far the most influential observation, while Cook's Distance is largest for either Singapore or Hongkong.[58] Singapore's relatively large residual may be explained by the fact that its is a major transshipment hub. Summarizing, the results presented above suggest that the statistical significance of the partial association between measures of natural resources and institutional quality is not robust to the econometric specification.

3.4 Natural Resources, Ethnic Fractionalization and Institutions

Even if natural resource do not harm institutions on average, natural resource abundance may lead to worse political outcomes in countries where ethnic fractionalization is high. The hypothesis that natural resources abundance harms institutions in ethnically

[57] Sala-i-Martin and Subramanian's (2003) measures of real GDP is taken from Penn World Tables 5.6. The Penn World Tables do not present information for some of the most oil rich countries.

[58] DFITS for Singapore is, depending on the natural resource measure, approximately 2, which is compared to $2 * \sqrt{\frac{nvar}{nobs}}$. This cut-off value assumes the value of 0.9 if the number of observations is 68. Cook's Distance for Singapore and Hongkong range from 2 to 3.5.

fractionalized countries is estimated by using the following linear regression:

$$RuleLaw = c_o + c_1 Resource + c_2 Ethnic + c_3 EResource + \beta X + u \qquad (14)$$

where $E\,\mathrm{Re}\,source$ is the interaction term between ethnic fractionalization and a natural resource measure. Ethnic fractionalization and natural resource measures are centered around their mean to reduce multicollinearity and to facilitate interpretation.[59] X is a set of control variables and will be discussed below.

The coefficients on the interaction term between ethnic fractionalization and most measures of mineral and fuel abundance are negative and highly significant (table $III.5$). All three specifications in this table include an interaction term between ethnic fractionalization and various measures of natural resource abundance. They differ, however, in their set of control variables. Specification A controls for ethnic fractionalization and the interaction term between natural resource measures and ethnic fractionalization. Adding the interaction term does not significantly change the size and significance level of the coefficients on the control variables. The adjusted R-square, however, increases slightly.[60] In specification B, the index of prevalence of malaria (malfal66) and the average investment price level between 1960 and 1964 (pi6064) are dropped since these variables are not significant at the ten percent level in previous specifications.[61] Excluding these variables from the regression does not lead to any sizeable change in neither magnitude nor significance of the estimated coefficients but to a slight increase in the sample size. Specification C incorporates latitude and regional dummies in the set of control variables.

When adding the interaction term, the coefficients on all measures of mineral and fuel abundance turn insignificant. Since the control variables in the regression are centered around their mean, the coefficients on measures of natural resources can be interpreted as the marginal effect of the respective natural resource measure on institutional quality evaluated at the mean of ethnic fractionalization. The coefficient on the share of mineral and fuel exports in exports, for example, may be interpreted as the weighted average effect of each coefficient of this share across all observed values of ethnic fractionalization.[62] As can be seen in column C of table $III.5$, the marginal effect of mineral and fuel abundance on institutional quality is close to zero and not statistically significant when evaluated at the average level of ethnic fractionalization.

But the coefficient on the interaction term between most measures of mineral and fuel abundance and ethnic fractionalization remains statistically significant at the one percent level even when controlling for latitude (see column C, table $III.5$). As a consequence, the marginal effect of mineral and fuel exports as a share of exports and GDP becomes significantly negative at high levels of ethnic fractionalization. Table $III.6$ shows that if the probability that two randomly selected individuals from a population belong to

[59] Centering reduces multicollinearity, since the covariance between each of the centered variables that enter the cross-product and the cross-product itself is zero if both variables are bivariate normal. In the regression, the only remaining correlation between the first order term and the cross-product is due to the nonnormality in the variables.

[60] Compare column B in table 3 with column A in table 5.

[61] For further evidence, see table 3 and table 4.

[62] The mean of ethnic fractionalization in the sample is 0.458 corresponding closely to the level of ethnic fractionalization in USA, India, Venezuela and Sri Lanka.

different groups is 0.655 (65th percentile), an increase in the share of mineral and fuel exports in exports by one standard deviation decreases Rule of Law by 0.193. This effect is significant at the 5 percent significance level. At the 90th percentile of ethnic fractionalization, an increase in mineral and fuel exports as a share of total exports by one standard deviation is associated with a decrease of Rule of Law by 0.289 or one third of a standard deviation.

While mineral and fuel exports as a share of exports and GDP exert a significantly negative marginal effect on institutional quality when ethnic fractionalization is high, the marginal effect of mineral and fuel exports per capita is positive and significant when ethnic fractionalization is low. Some countries with a high level of mineral and fuel exports per capita and a low level of ethnic fractionalization are, for example, Australia, Canada, Netherlands, Norway and the United States. Many of these countries managed to diversify their exports and figure now among the richest countries in the world. As a consequence, their share of mineral and fuel exports as a share of exports is low. The difference in the marginal effects of the mineral and fuel exports as a share of exports and mineral and fuel exports per capita may highlight the issue of a potential endogeneity bias that may arise from the fact that exports are likely to be determined by the quality of a country's institutions. If institutions are persistent than even past exports may be correlated with today's institutions.

Contrary to measures of mineral and fuel abundance, food and agricultural exports as a share of exports and GDP are positively associated with rule of law when ethnic fractionalization is large. This may reflect the fact that countries with a high degree of ethnic fractionalization are more likely to employ small crop production technologies. As discussed above, the hypothesis has been proposed that countries characterized by small crop production may develop stronger institutions. Countries with a high level of ethnic fractionalization and a high share of agricultural and food exports are Gambia, Madagascar, Ghana and Tanzania, subsuming countries that rely primarily on the production of coffee and cocoa. These crops can either be grown on plantations or small family farms.

But then, countries characterized by a high level of ethnic fractionalization and a large share of agricultural and food exports are concentrated in Subsaharan Africa. This implies that even if these products are produced on a small farm scale, they are potentially susceptible to rent extraction from small holders via marketing boards. According to Sachs and Warner (1995) all Subsaharan countries but one had marketing boards in the 1980s. Government-controlled marketing boards systematically paid farmers below world market prices. The surpluses of the marketing board were given to the government.

The relation between the size of rents extracted from the marketing boards and ethnic fractionalization, however, is far from clear. Bates (1981) states that marketing boards in Ghana, Nigeria and Zambia lead to poor agricultural performance, while its effect in Kenya was much less deleterious during Jomo Kenyatta's presidency. He argues that - apart from generating revenues for the government - marketing boards were also aimed at reducing the cost of food for urban constituents in order to appease urban interests. This implies that the marketing board's agricultural pricing policy depended on how much relative weight the ruling party assigned to urban and rural constituents. While in Ghana, Nigeria and Zambia farmers were small landholders, landownership in Kenya was more

concentrated, facilitating collective action.[63] While small scale agricultural productions may allow the development of stronger institutions, rent extraction through marketing boards may be more pervasive when landholders are small. Understanding the relation between food and agricultural exports, ethnic fractionalization and institutional quality would thus require to control for distribution of landownership, as well as existence and design of marketing boards. Analyzing the relation between these variables would go beyond the scope of this chapter, but definitely warrant further research.

The marginal effect of ethnic fractionalization on institutional quality is large, significant and negative in countries rich in mineral and fuel resources as well as natural capital (table $III.7$). It is not significant if natural resources are scarce. Increasing ethnic fractionalization by one standard deviation reduces institutional quality by 0.481, nearly half a standard deviation, when mineral and fuel exports as a share of exports correspond to their 90th percentile. A similar increase in ethnic fractionalization is associated with a reduction of Rule of Law by 0.331 when mineral and fuel exports as a share of GDP amount to 29.04 percent. The marginal effect of ethnic fractionalization is significantly negative if the share of food and agricultural exports in total is low.

The specifications presented so far did not control for openness. This may be of concern since not controlling for openness may lead to a downward bias in the coefficients on natural resources and henceforth to the wrong conclusion that natural resources harm institutions. Openness is widely considered to be positively associated with a country's quality of institutions. Countries with good governments tend to be more open since trade with other countries is likely to enhance a country's productivity (Ciccone and Alcala, 2004) by facilitating the adoption of ideas and technologies, generating gains from specialization or allowing to exploit economies of scale. At the same time, opening up to trade may lead to an improvement of the legal and governmental institutions since the elimination of barriers to trade, for example, may erase opportunities for engaging in rent-seeking activities.[64] Resource abundant countries, on the other hand, may favor protectionist trade policies in order to guard against the Dutch Disease and to sustain the manufacturing sector.[65] If openness is negatively correlated with a given measure of natural resource abundance, then the coefficient on this natural resource measure would turn less negative when openness is added to the regression. Not controlling for openness may then lead to the wrong conclusion that natural resources exert a negative effect on institutions.[66]

[63] Bates (1981) also points out that farming was important in the Kikuyu area, an ethnic group that was closely related to the ruling party. As a consequence, farmers in Kenya were a powerful lobby and were able to guarantee themselves higher prices. When Daniel Moi came to power the ethnic basis of the regime changed from Kikuyu to Kalenjin and as a result agricultural policies that strengthened the position of the farmers were abandoned.

[64] Trade restrictions may trigger of rent-seeking activities, such as attempting to evade tariffs, appropriating a share of the revenue that results from import restrictions, competing for premium-fetching licenses or lobbying for the imposition of protectionist tariffs. This linkage between trade and the diversion of resources to government and private sector induces Hall and Jones (1999) to use the Sachs Warner openness index as a component of their measure of social infrastructure. Hall and Jones (1999) define social infrastructure as "institutions and government policies that determine the economic environment within which individuals accumulate skills, firms accumulate capital and produce output."

[65] See Sachs and Warner, 1995b, for empirical evidence.

[66] This may be a reason why openness has been included in previous studies analyzing the association

When adding openness to the standard specification in specification A of table $III.8$, the coefficients on past GDP per capita as well as the coefficients on natural resources and their interaction terms with ethnic fractionalization become less negative. The coefficient on openness is positive and mostly significant at the five percent level. The marginal effect of any measure of fuel and mineral abundance becomes less negative for a given level of ethnic fractionalization. The direction of the change in coefficients is henceforth consistent with the prediction made above.

But interpreting this change in coefficients is not straightforward since the measure of openness used is based on the Sachs Warner Index of openness (Sachs and Warner, 1995b).[67] The Sachs and Warner openness index has been widely used in the literature and is constructed from dummies related to five different dimensions of trade policies: 1) average tariff rates, 2) non-tariff barriers, 3) black market premium, 4) state monopoly on major exports and 5) a socialist economic system.[68] These five different dummies are combined into a single dichotomous variable since they represent different ways in which policy makers can close their economies to international trade. Rodrik and Rodriguez (1999) argue that the criteria used for the black market premium and the state monopoly on exports generate a dummy variable that matches the Sachs and Warner index in 95 percent of all observations. As a consequence, very little of the statistically power of the index would be lost if it were to be constructed only from these two indicators and the explanatory power of the two most direct measures of trade policy, i.e. tariff and non-tariff barriers, is low.

What is more, Rodrik and Rodriguez (1999) argue that the significance of the black market premium and the state monopoly variable in growth regressions arises from the fact that they are correlated with other determinants of growth such as macroeconomic policy failures in the case of the black market premium and Sub-Saharan Africa in the case of the state monopoly variable. The latter arises from the fact that Sachs and Warner (1997) constructed the dummy for state monopoly of exports on a study of African countries. All, but one, Sub-Saharan African countries are classified to be closed on the basis of

between natural resources and institutional quality. See for example, Leite and Weidmann, 1999; Isham et al. 2003; Sala-i-Martin and Subramanian, 2003.

[67] Measure used in this study is the fraction of years during which a country has been rated as open between 1970 and 1979. A country is rated open if the Sachs Warner Index of openness in a given year equals one. Since current institutional quality is likely to determine current trade policies, the regression controls for past openness. since the Sachs Warner index is likely to subsume not only restrictive trade policies, but to also capture other past policy failures.Using the Sachs-Warner index for 1970 to 1990 does not significantly change the estimated coefficients on measures of natural resources. The adjusted R-square, however, improves slightly. Results are available upon request.

[68] A country is classified as closed if it satisfied at least one of the following characteristics:

1) Average tariff rates of 40 percent more;

2) Non-tariff barriers covering 40 percent or more of trade;

3) A black market exchange rate that is depreciated by 20 percent or more relative to the official exchange rate, on average, during the 1970s or 1980s;

4) A state monopoly of exports;

5) A socialist economic system.

If a country is rated as closed, the Sachs Warner index assumes value 0. For more information regarding the construction of the Sachs-Warner Index of Openness, see Sachs and Warner (1995).

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these criteria alone. As a consequence, the Sachs-Warner dummy for state monopoly of exports is almost identical to the Sub-Saharan dummy included in the regression.

To further explore the question whether including measures of openness would weaken the empirical results, the Rodrik and Rodriguez (1999) critique of the Sachs and Warner index for openness is addressed here by analyzing the association of the components of the index with Rule of Law. As can be seen in specifications B to D of table $III.8$, none of the components of the Sachs-Warner openness indicator is significantly associated with Rule of Law. Controlling for either the black market premium, own-import weighted tariff rates or non-tariff barriers does not lead to a substantial change in size and significance of the estimated coefficients. Controlling for different measures for openness does therefore not weaken the empirical finding that the marginal effect of mineral and fuel abundance on institutional quality decreases with ethnic fractionalization.

While the specifications presented in this study so far, include several variables that capture past institutional quality, such as the density of coastal population in 1965 or the share of population speaking English, two important determinants of institutional quality, the origin of the legal system and religion, have so far not been considered in the regressions. Adding measures of legal origin and religion in table $III.9$ reveals that countries where French commercial law prevails have less secure property rights than countries where the English common law rules. Moreover, the quality of institutions is lower in countries with a significant share of Catholic population. This is consistent with the findings presented in La Porta et al.'s (1999) chapter on determinants of present legal and government institutions.

Controlling for legal origin and religion does not alter the coefficients of the natural resource variables and their interaction terms with ethnic fractionalization significantly. The coefficients on the interaction terms of mineral and fuel exports as a share of exports and GDP remain negative and highly significant at the one percent level. Similarly, the corresponding coefficient on mineral and fuel exports per capita is significant at the five percent level once legal origin and religious dummies are included in the set of regressors.

As discussed above, natural resources provide means and incentives to people who live in resource-rich regions to form an independent state and may contribute significantly to triggering, prolonging and financing civil conflicts. The occurrence of a violent secessionist movement is statistically more likely in natural resource abundant countries. In many instances, ethnic cleavages can appear to generate the conflict and secessionist movements could seem to be ethnically based. Often the conflict seems to appear as an ethnically distinct population enjoys few benefits from resource extractions, while bearing the costs. Examples are Aceh (Indonesia), Biafra (Nigeria) and Katanga (DRC).[69] Empirical evidence regarding whether the probability of civil conflict is higher in ethnically more diversified societies is, however, ambiguous. Fearon and Laitin (1996) show that cooperation is more common than conflict in ethnically diversified societies. Collin and Hoeffler (2001) provide empirical evidence that ethnic diversity is associated with a reduced risk of violent conflict. To the contrary, Garcia-Montalvo and Reynal-Querol (2005) provide empirical evidence that ethnic polarization affects the incidence of civil war to a large extent.[70]

[69] See Collier and Hoeffler (2001) and Ross (2001, 2003).

[70] Garcia-Montalvo and Reynal-Querol (2005) find, however, no statistically significant effect of ethnic

When controlling for genocidal incidence or revolutions and coups in table $III.10$, the coefficients on the interaction terms between measures of mineral and fuel abundance and ethnic fractionalization decrease substantially. They turn insignificant once genocidal incidence and revolution and coups are taken into account. The share of food and agricultural exports in GDP, however, continues to be positively associated with institutional quality. The results suggest that the occurrence of conflict may be one reason why the marginal effect of natural resource exports expressed in terms of exports and GDP on institutional quality is significantly negative when ethnic fractionalization is high.

It may also be the case that the finding of a negative interaction term between measures of mineral and fuel abundance and ethnic fractionalization is driven by the Sub-Saharan African subsample. Sub-Saharan African countries are, therefore, dropped in the specifications presented in table $III.11$. As a consequence, the sample size shrinks by about 20 percent. The coefficients on the interaction term of most measures of natural resources and ethnic fractionalization, however, do not change substantially. The only exception is the coefficient on the interaction term between natural resource rents per capita and ethnic fractionalization. This coefficient doubles relative to the core specification (specification C in table $III.5$) and turns significantly negative at the one percent level.

Since outliers may distort the findings of OLS cross-country regressions, table $III.12$ presents estimates of an iteratively re-weighted least squares estimation that gives less weight to influential observations. The estimation technique is maximum likelihood. In a first step, weights from scaled residuals are computed, with the scale equal to the median absolute deviation about the median residual divided by a constant (see Huber, 1981). If the residual is small the case weight equals one. If it is larger, the case weight equals the constant divided by the absolute value of the scale. In a second step, biweights are applied. Biweights downweight all cases with residuals and assign cases with large residuals zero weight. This iteratively reweighting procedure is used since Huber weights have problems with extreme outliers and biweights may have sometimes problems with converging to a solution. Since outliers could be a serious problem in the data and since the distribution of residuals approximates a normal distribution well, this estimation procedure is preferable to, for example, a quantile regression.

When applying this technique to core specification without interaction term, the coefficients on all measures of natural resources, with the exception of the share of food and agricultural exports in GDP, remain insignificant. As can be seen in specifications B (core specification with interaction term) and C (controlling for past institutions) of table $III.12$, the magnitude of the estimated coefficients on the interaction terms between measures of mineral and fuel abundance remains largely unchanged.

Summarizing, these results show that the marginal effect of ethnic fractionalization on institutional quality depends significantly on ethnic fractionalization and that the marginal effect on institutional quality differs among natural resource measures. Economies that relief heavily on oil and fuel exports in the past tend to have a significantly lower quality of institutions today if ethnic fractionalization is high. The fact that natural resources provide means and incentives to trigger and prolong violent conflicts is likely to be one channel through which mineral and fuel abundance casts its spell on institutional

fractionalization on the incidence of civil war.

quality.

3.5 Alternative Specifications

3.5.1 Polarization

The ethnic fractionalization index has been criticized in the literature for neither capturing a country's potential for conflict nor for rent-seeking activities, since it captures the probability that two individuals belong to different ethnic groups. The probability of being matched with an individual of a different ethnic group may tell little about a country's potential for conflict or for rent-seeking activities. A large number of different ethnic groups is less likely to be harmful to a country's institution than two equally sized groups competing over rents. To capture this notion, Garcia-Montalvo and Reynal-Querol (2002) propose the following polarization index:

$$RQ = 1 - \sum_{i=1}^{N} (\frac{0.5 - s_i}{0.5})^2 s_i$$

This index reaches its maximum when there are two groups of equal size.[71] The relationship between ethnic fractionalization and the polarization index is positive and close to linear when ethnic fractionalization is low. The two indices are uncorrelated at intermediate levels of ethnic fractionalization. Their correlation turns negative when ethnic fractionalization is high (Garcia-Montalvo and Reynal-Querol, 2002).[72]

Substituting ethnic fractionalization with polarization in table $III.13$ does not affect the qualitative results of this chapter since the association between mineral and fuel abundance and institutional quality becomes more negative as polarization increases. The interaction terms between measures of mineral and fuel abundance and polarization are significant at the five percent level with the exception of the share of mineral and fuel exports in GDP. The corresponding coefficient on mineral and fuel resource rents per capita, however, becomes significant. Similar to the core specification with ethnic fractionalization, the marginal effect of polarization on institutional quality is insignificant when evaluated at the mean of any of the measures of mineral and fuel abundance.

A further similarity with previous results is that the marginal effect of mineral and fuel exports as a share of total exports turns significantly negative at high levels of polarization, while the effect of mineral and fuel rents and exports expressed in per capita terms is significantly positive when polarization is low (see table $III.14$). The similarity of the results is striking given the low correlation between polarization and ethnic fractionalization at high levels of ethnic fractionalization. Countries characterized by high mineral and fuel exports per capita and low polarization are Norway and Netherlands. Eliminating these observations from the sample, does not alter the fact that the mineral

[71] Garcia-Montalvo and Reynal-Querol (2002) further show that the RQ index can be derived from a simple model of rent-seeking and provide a discussion of the theoretical underpinnings of the two indices.

[72] Countries with a high share of mineral and fuel exports in total exports and a high polarization index are Bahrain, Kuwait, Mexico and Trinidad and Tobago.

effect of mineral and fuel rents per capita is significantly positive when polarization is low.[73]

Finally, the marginal effect of share of the food and agricultural exports in GDP is significantly and positively associated with institutional quality if polarization exceeds its 40th percentile. Confirming previous findings, the marginal effect of food and agricultural shares on institutional quality increases with polarization. And again, as can be seen in table $III.15$, the marginal effect of polarization on Rule of Law is negative and significant in countries characterized by very high mineral and fuel exports as a share of exports and population.

3.5.2 Aid

Similar to natural resource rents, foreign aid has been identified to enhance rent-seeking activities and to weaken pressure for reforms. Contrary to natural resources, however, aid allocation is often linked to conditionality and ear-marked towards improving legal and administrative quality or educational attainment.[74] It is henceforth less clear cut whether aid weakens institutional quality. It may therefore seem surprising that some authors have claimed that the damaging effect of aid on democracy substantially exceeds the deleterious effect of oil rents (Djankov, Montalvo and Reynal-Querol, 2005).

If aid rents have a similar effect on institutional quality then natural resources rents, then aid may also exert a negative effect on institutions if ethnic fractionalization is large. Svensson (1998) argues that more discretionary aid and by the same token windfall gains from natural resources make cooperation among social groups more difficult to sustain. As a consequence, rent-seeking activities in countries with a divided fiscal process increase with aid and windfall gains from natural resources. He provides empirical evidence that the effect of aid on institutional quality becomes more negative in countries characterized by a higher degree of ethnic fractionalization. To the contrary, Knack (2004) concludes that the impact of aid on the quality of governance worsens with greater ethnic homogeneity.

Addressing the question whether aid has a similar effect on institutional quality than natural resource rents, the present study uses the same empirical specifications as presented above and simply substitutes natural resource variables with measures of aid. Empirical studies on aid generally use data on official development assistance (ODA) from the OECD to measure foreign aid. ODA refers to grants and loans from official creditors provided on concessional terms to developing countries.[75] The data is provided in current US dollars. Burnside and Dollar (2000) and Djankov, Montalvo and Reynal-Querol (2005) transform this data in constant dollars and to purchasing power parity using the IMF's Import Value Index. Whether ODA should be adjusted for purchasing power parity depends on whether it is spent on tradeable or non-tradeable goods. Since it is usually spend on both and since the proportion of ODA spent on tradeables varies

[73] Results are available upon request.

[74] As discussed above, improving educational attainment may enhance a country's quality of policies and institutions.

[75] Loans and grants used for military purposes are excluded in the ODA definition.

across countries, there is a priori no justification for using one or the other measure in a cross-country regression. For this reason, the estimates below present both measures of ODA. ODA is a measure of the funds that a country receives. It does not provide information on the funds that are available to a country in a given year. Therefore, ODA net transfers and net flows are added to the list of regressors. Analog to the measures on natural resources, aid variables are expressed in terms of GDP and population.

The empirical results suggest that similar to most natural resources measures, aid is not significantly associated with institutional quality when a constant marginal effect of aid on institutional quality is assumed. None of the coefficients on measures of aid flows nor ethnic fractionalization is significant at the five percent level in the core specification (column A, table III.16). In contrast to the natural resource specification, the signs on the aid coefficients, however, are not consistently negative.

When interacting measures of aid flows with ethnic fractionalization (column B, table III.16, the marginal effect of net flows in GDP (NFLgdp), net flows per capita (NFLpercap) and net transfers per capita (NTRpercap) evaluated at the mean of ethnic fractionalization become significantly positive. The interaction term of the three variables is throughout negative and significant, indicating that the marginal effect of aid on institutional quality decreases as ethnic fractionalization increases. As a consequence, the marginal effect of aid on institutional quality is significantly positive at lower levels of ethnic fractionalization and becomes negative and significant at high levels of ethnic fractionalization (table III.17). The size of this effect is large. Increasing the share of net flows in GDP by one standard deviation raises the Rule of Law index by 0.75 points if ethnic fractionalization is at the 30th percentile. The marginal affect of ethnic fractionalization on quality of institutions is negative and large when aid flows are low (table III.18).

Contrary to the specifications with natural resources, the marginal effect of aid on Rule of Law does not alter significantly when controlling for revolutions, coups and genocidal incidents (column C, table III.16). This may reflect the fact that conditionality of official development assistance prevents recipient governments of using aid flows for military purposes. Governments may have incentives to abide by the rules of conditionality since ODA loans and grants or often disbursed in tranches and in order to avoid a disruption of future lending. It may also reflect the fact that while diamond mines and oil fields can be appropriated by rebel groups, official aid is generally provided to sovereign and internationally recognized governments. Moreover, natural resource based conflicts seem to appear as the population living in the areas where natural resources are extracted have to bear the costs of extraction while only enjoying few benefits (Ross, 2003). Costs on the local population from aid allocation are more likely to be small and less visible. An exchange rate appreciation induced by aid inflows, for example, may harm small agricultural producers but the farmer is unlikely to be aware of this link. Finally, the amount of aid allocations to a country may be less visible for the average population then, for example, a diamond mine.[76]

[76] Although natural resources may be more prone to triggering conflicts than aid, large aid inflows may contribute to henerating and prolonging conflicts under certain circumstances. Maren (1997), for example, claims that the desire to control aid inflows triggered Somalia's civil war. Anecdotal evidence suggests that food aid to regions engaged in civil war where partially deviated to fighting rebels and may,

Low aid inflows may simply indicate that government performance is weak. If countries with strong institutions tend to attract more aid, than the effect of aid on institutional quality would be overestimated in a standard OLS cross-country regression. Second, political and strategic interest of donors tends also to determine aid allocation. Supporting countries with good government performance could be one of them. Alesina and Dollar (2000), for example, find that democratization tends to be rewarded by higher aid flows at the margin. Last, the quality of a country's institutions is a determinant of the aid allocation rules of major multilateral creditors.[77] As a consequence, almost all recent studies on aid effectiveness test whether endogeneity of aid biases their estimated coefficients. Most studies accept the null hypothesis of exogeneity of parameters which implies that OLS estimates are unbiased. Some studies apply instrumental variable strategies. Burnside and Dollar (2000) propose to use arms imports relative to total imports, the size of the population and various regional indicators (Egypt, Franc Zone countries, Central America) as instruments. The predicted trade share from Hall and Jones (1999) is added to this list since trade and strategic interests have been identified as one of the determinants of aid allocations.[78] As discussed above, trade is likely to be determined by institutional quality and would therefore not qualify as a valid instrument for aid. But the predicted trade share is correlated with trade and improving relationships with countries that have a good access to markets may be one strategic interest of aid flows. At the same time, it is clearly exogenous to a country's quality of institutions.

When testing whether aid variables are endogenous, the hypothesis that OLS is inconsistent cannot be rejected for net flows per capita and net flows as a share of GDP. A first stage regression of aid variables on the instruments proposed by Burnside and Dollar (2000) plus the predicted trade share shows that adding the predicted trade share leads to an improvement in the adjusted R-square for some aid variables. Nevertheless, the instruments are weak. The adjusted R-square in the first stage regression ranges from 0.29 for ODA as a share to GDP to 0 for net flows to GDP and net flows per capita. Instruments are, hence, especially weak for those aid variables that are likely to be endogenous.

Similar to the OLS estimates the instrumental variable estimates suggest that the marginal effect of some aid variables on Rule of Law is positive when evaluated at the average level of ethnic fractionalization (specification E of table $III.16$). The interaction term between ethnic fractionalization and aid variables, however, turns insignificant for all aid variables.

Net flows and net transfers are measures of the aid resources available to a government and therefore capture best the concept of aid rents. The OLS results seem to indicate that the marginal effect of net flows on institutional quality is significantly positive when ethnic fractionalization is low and decreases as ethnic fractionalization rises. When using instruments to control for endogeneity of aid inflows, the coefficient on these aid variables declines and the interaction term with ethnic fractionalization turns insignificant. Contrary to rents from mineral and fuel resources, aid flows are much more likely to be

thus, have contributed to prolonging conflicts.

[77] For a discussion on how aid influences governance, see Knack (2001).

[78] The voluminous literature on aid allocations identifies poverty level of the recipient country, strategic interests, colonial history, trade and the quality of the political institutions in the recipient countries as determinants of aid inflows. (see for example, Alesina and Dollar, 2000; Rajan and Subramanian, 2004).

associated with better institutions, especially if ethnic fractionalization is low.

3.6 Conclusion

Mineral and fuel abundance is on average not significantly associated with lower institutional quality. Its marginal effect on the quality of institutions becomes, however, more negative as ethnic fractionalization increases. Whether mineral and fuel abundance is associated with a positive or with a negative effect on institutions depends on the measure of mineral abundance. Economies that relied heavily on oil and fuel exports in the past tend to have a significantly lower quality of institutions today if ethnic fractionalization is large. This does not mean that countries rich in mineral and fuel resources do necessarily have weaker institutions. High mineral and fuel rents per capita in the past are actually associated with better institutional quality when ethnic fractionalization is low.

Analyzing the association between aid flows and institutional quality, the overall picture emerges that the effect of aid flows on institutional quality may be inherently different to the effect of natural resources. First, contrary to measures of mineral and fuel abundance expressed in terms of GDP and exports, aid variables are not associated with significantly weaker institutions when ethnic fractionalization is high. If anything, more aid in the past seems to go hand in hand with better institutions today in countries characterized by a low level of ethnic fractionalization. Second, the marginal effect of ethnic fractionalization is insignificant at high levels of aid. Third, in contrast to aid, mineral and fuel abundance seems to erode institutions by providing means and incentives to engage in violent conflicts. Natural resource abundance has also been in the US one of the principal motives underlying the civil war. Implementing mechanisms that reduce the incentives to engage in violent conflict in resource abundant countries is likely to be a crucial step for breaking the natural resource curse.

Tables

Table III.1. Most Resource Abundant Countries

Natural Capital Exports (% of Merchandise Exports)		Mineral & Fuel Exports (% of Merchandise Exports)		Food & Agricultural Exports (% of Merchandise Exports)		Mineral & Fuel Rents per Capita (in USD thousands)		Mineral & Fuel Exports per Capita (in USD thousands)	
All Observations on Natural Resource Variables									
Brunei	100.0	Gabon	100.0	Gambia, The	99.3	United Arab Emirates	2161.5	Brunei	2372.9
Algeria	99.7	Brunei	100.0	Vanuatu	98.7	Kuwait	1350.0	Bahamas, The	1360.2
Saudi Arabia	99.4	Saudi Arabia	99.2	Mali	98.6	Saudi Arabia	1259.5	Kuwait	1272.8
Somalia	99.2	Algeria	98.9	Fiji	98.1	Libya	668.4	Saudi Arabia	1154.3
Sudan	99.1	Venezuela, RB	97.9	Samoa	97.9	Oman	263.1	Bahrain	1040.6
Ghana	99.0	Bahrain	96.7	Sudan	97.6	Trinidad and Tobago	251.8	Trinidad and Tobago	350.0
Venezuela, RB	98.3	Oman	96.2	Tonga	96.5	Iraq	240.1	Oman	327.4
Niger	97.9	Bahamas, The	95.8	Somalia	94.4	Gabon	239.4	Gabon	312.7
Indonesia	97.6	Trinidad and Tobago	92.9	Seychelles	93.4	Venezuela, RB	193.9	Norway	266.6
Bahrain	97.2	Congo, Rep.	89.8	Malawi	93.3	Norway	170.7	Singapore	222.0
Data Set									
Algeria	99.7	Gabon	100.0	Gambia, The	99.3	Kuwait	1350.0	Kuwait	1272.8
Saudi Arabia	99.4	Saudi Arabia	99.2	Mali	98.6	Saudi Arabia	1259.5	Saudi Arabia	1154.3
Sudan	99.1	Algeria	98.9	Sudan	97.6	Trinidad & Tobago	251.8	Trinidad & Tobago	350.0
Ghana	99.0	Venezuela, RB	97.9	Malawi	93.3	Gabon	239.4	Gabon	312.7
Venezuela, RB	98.3	Trinidad and Tobago	92.9	Burkina Faso	89.0	Venezuela, RB	193.9	Norway	266.6
Niger	97.9	Congo, Rep.	89.8	Paraguay	88.3	Norway	170.7	Singapore	222.0
Indonesia	97.6	Kuwait	89.0	Benin	86.8	Canada	127.2	Netherlands	133.5
Bolivia	97.1	Niger	85.8	Madagascar	84.1	United States	88.3	Venezuela, RB	124.7
Ecuador	97.0	Bolovia	85.8	Nicaragua	82.7	Australia	81.2	Belgium	97.2
Cameroon	96.2	Syria	80.0	Ghana	82.0	Algeria	73.0	Canada	77.5

Data Source: WDI. Year: 1980. Data set refers to all observations that provide information on the control variables used in specification C of Table III.5.

Table III.2. Correlation Coefficients

	RuleLaw	NCapXX80	MFuelXX80	FdAgXX80	NCapXGDP80	MFuelXGDP80	FdAgXGDP80	Rent80	MFuelP80	lrgdpWDI	Ethnic	Engfrac	Latitude
RuleLaw	1												
NCapXX80	-0.656*	1											
MFuelXX80	-0.279*	0.559*	1										
FdAgXX80	-0.420*	0.418*	-0.520*	1									
NCapXGDP80	-0.093	0.471*	0.606*	-0.176	1								
MFuelXGDP80	0.010	0.382*	0.809*	-0.476*	0.892*	1							
FdAgXGDP80	-0.056	0.233*	-0.333*	0.573*	0.325*	-0.137	1						
Rent80	0.124	0.202	0.455*	-0.282*	0.568*	0.687*	-0.218	1					
MFuelP80	0.136	0.177	0.469*	-0.312*	0.639*	0.750*	-0.168	0.981*	1				
lrgdpWDI	0.834*	-0.589*	-0.089	-0.534*	-0.038	-0.081	-0.232	0.285*	0.298*	1			
Ethnic	-0.559*	0.565*	0.286*	0.321*	0.244*	0.235*	0.130	0.027	0.018	-0.498*	1		
Engfrac	0.373*	-0.119	-0.033	-0.122	0.046	0.041	0.021	-0.039	0.011	0.336*	-0.101	1	
Latitude	0.748*	-0.613*	-0.259*	-0.385*	-0.369*	-0.264*	-0.345*	0.048	0.023	0.675*	-0.567*	0.242*	1

Data Source: see Data Appendix. Correlation coefficients are calculated on all observations that provide information on the control variables used in specification C of Table III.5. Number of observations ranges from 93 to 72. * denotes significant at 5 percent significance level.

Table III.3. Rule of Law and Natural Resources

	A. Basic Specification										B. Adding Ethnic Fractionalization									
	I	II	III	IV	V	VI	VII	VIII	IX	X	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpl70	0.537***	0.603***	0.628***	0.701***	0.697***	0.763***	0.690***	0.813***	0.734***	0.623***	0.522***	0.584***	0.596***	0.661***	0.670***	0.733***	0.658***	0.778***	0.711***	0.574***
	[0.137]	[0.134]	[0.109]	[0.133]	[0.124]	[0.124]	[0.112]	[0.126]	[0.111]	[0.127]	[0.140]	[0.139]	[0.121]	[0.141]	[0.133]	[0.133]	[0.123]	[0.136]	[0.117]	[0.140]
p60	0.915**	0.767*	0.694	0.672*	0.990***	0.767*	0.816**	0.366	0.401	1.047**	0.845**	0.717	0.638	0.531	0.855**	0.665	0.726*	0.216	0.285	0.908**
	[0.409]	[0.446]	[0.446]	[0.402]	[0.362]	[0.400]	[0.360]	[0.407]	[0.330]	[0.405]	[0.418]	[0.439]	[0.434]	[0.412]	[0.384]	[0.405]	[0.370]	[0.421]	[0.341]	[0.412]
pi6064	0.153	0.145	0.08	0.032	0.052	0.187	0.152	0.038	-0.216	0.027	0.184	0.173	0.122	0.095	0.095	0.214	0.175	0.102	-0.187	0.077
	[0.260]	[0.234]	[0.231]	[0.249]	[0.246]	[0.247]	[0.240]	[0.236]	[0.158]	[0.272]	[0.254]	[0.229]	[0.227]	[0.245]	[0.250]	[0.245]	[0.241]	[0.233]	[0.151]	[0.272]
malfal66	-0.067	-0.131	-0.292	-0.168	-0.005	-0.027	-0.127	-0.08	-0.23	-0.258	0.101	0.024	-0.11	0.026	0.184	0.144	0.037	0.105	-0.126	-0.023
	[0.228]	[0.229]	[0.202]	[0.254]	[0.220]	[0.221]	[0.197]	[0.230]	[0.174]	[0.221]	[0.250]	[0.257]	[0.235]	[0.268]	[0.237]	[0.233]	[0.215]	[0.245]	[0.192]	[0.241]
dens65c	0.016	0.018	0.020*	0.027**	0.029*	0.030**	0.033*	0.023***	0.024**	0.025**	0.015	0.017	0.019	0.025**	0.025	0.026*	0.029	0.021**	0.022**	0.022
	[0.012]	[0.012]	[0.010]	[0.010]	[0.016]	[0.014]	[0.018]	[0.008]	[0.009]	[0.012]	[0.014]	[0.013]	[0.012]	[0.012]	[0.015]	[0.014]	[0.018]	[0.009]	[0.011]	[0.013]
dtt7090	-0.032	0.011	0.007	-0.046	-0.025	0.016	-0.002	-0.034	-0.031	-0.063**	-0.026	0.012	0.007	-0.037	-0.021	0.016	-0.003	-0.023	-0.023	-0.053*
	[0.033]	[0.054]	[0.052]	[0.034]	[0.036]	[0.046]	[0.041]	[0.034]	[0.025]	[0.030]	[0.031]	[0.049]	[0.047]	[0.034]	[0.035]	[0.043]	[0.038]	[0.034]	[0.025]	[0.029]
eurfrac	-0.560***	-0.626***	-0.687***	-0.676***	-0.707***	-0.728***	-0.703***	-0.675***	-0.606***	-0.725***	-0.528**	-0.593***	-0.635***	-0.603**	-0.646***	-0.672***	-0.648***	-0.607***	-0.558***	-0.644***
	[0.210]	[0.218]	[0.205]	[0.248]	[0.214]	[0.215]	[0.210]	[0.225]	[0.211]	[0.215]	[0.202]	[0.215]	[0.201]	[0.240]	[0.205]	[0.211]	[0.204]	[0.217]	[0.205]	[0.206]
engfrac	0.684*	0.705**	0.751**	0.731**	0.748**	0.744**	0.798**	0.665*	0.961***	0.775**	0.716**	0.732**	0.774**	0.759**	0.758**	0.753**	0.808**	0.692**	0.961***	0.799**
	[0.362]	[0.328]	[0.318]	[0.346]	[0.348]	[0.325]	[0.327]	[0.334]	[0.337]	[0.352]	[0.349]	[0.318]	[0.312]	[0.333]	[0.339]	[0.318]	[0.322]	[0.319]	[0.330]	[0.341]
Ethnic											-0.591	-0.528	-0.574	-0.680*	-0.671*	-0.603*	-0.579	-0.679*	-0.472	-0.779**
											[0.370]	[0.381]	[0.378]	[0.360]	[0.344]	[0.337]	[0.349]	[0.345]	[0.323]	[0.372]
Latitude																				
SubSah																				
SSEAsia																				
NCapXX80	-0.008**										-0.007*									
	[0.004]										[0.004]									
MFuelXX80		-0.011**	-0.009**									-0.009*	-0.008*							
		[0.005]	[0.004]									[0.005]	[0.004]							
FdAgXX80		-0.004		0.001								-0.003		0.001						
		[0.004]		[0.004]								[0.004]		[0.004]						
NCapXGDP80					-0.008										-0.005					
					[0.006]										[0.006]					
MFuelXGDP80						-0.017**	-0.018**									-0.014*	-0.015*			
						[0.007]	[0.008]									[0.007]	[0.008]			
FdAgXGDP80						0.011		0.011								0.012		0.012		
						[0.010]		[0.010]								[0.011]		[0.010]		
Rent80									-0.003										-0.003	
									[0.002]										[0.002]	
MFuelP80										-0.001										0
										[0.001]										[0.001]
Constant	-4.232***	-4.691***	-4.932***	-5.847***	-5.932***	-6.423***	-5.759***	-6.556***	-5.668***	-5.398***	-3.954***	-4.404***	-4.500***	-5.222***	-5.444***	-5.943***	-5.270***	-5.978***	-5.263***	-4.676***
	[1.178]	[1.097]	[0.796]	[0.992]	[0.974]	[0.963]	[0.852]	[0.945]	[0.816]	[0.955]	[1.219]	[1.161]	[0.921]	[1.115]	[1.086]	[1.085]	[0.985]	[1.085]	[0.911]	[1.122]
Observations	73	73	74	77	71	71	72	75	89	74	73	73	74	77	71	71	72	75	89	74
Adj. R-squared	0.72	0.73	0.73	0.67	0.71	0.73	0.72	0.69	0.71	0.69	0.73	0.74	0.74	0.68	0.73	0.74	0.73	0.7	0.71	0.7

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors are in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.3 (continued). Rule of Law and Natural Resources

	C. Adding Latitude and Regional Dummies									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpl70	0.270*	0.336**	0.290**	0.365**	0.372***	0.427***	0.353***	0.478***	0.464***	0.230*
	[0.141]	[0.150]	[0.129]	[0.150]	[0.134]	[0.135]	[0.124]	[0.131]	[0.111]	[0.130]
p60	1.211***	1.079***	1.051***	0.879***	0.943***	0.771**	0.979***	0.475	0.541*	1.172***
	[0.363]	[0.388]	[0.387]	[0.328]	[0.350]	[0.359]	[0.335]	[0.326]	[0.299]	[0.346]
pi6064										
malfal66										
dens65c	0.038**	0.038**	0.037**	0.040**	0.031**	0.031***	0.037**	0.031***	0.033*	0.038**
	[0.018]	[0.017]	[0.017]	[0.017]	[0.013]	[0.012]	[0.018]	[0.011]	[0.017]	[0.016]
dtt7090	-0.031	-0.003	-0.01	-0.012	-0.033	-0.009	-0.024	-0.006	-0.009	-0.040**
	[0.024]	[0.034]	[0.033]	[0.025]	[0.026]	[0.029]	[0.027]	[0.024]	[0.018]	[0.020]
eurfrac	-0.073	-0.144	-0.121	-0.002	-0.032	-0.091	-0.074	0	0.11	-0.033
	[0.187]	[0.211]	[0.200]	[0.219]	[0.187]	[0.206]	[0.196]	[0.191]	[0.188]	[0.194]
engfrac	0.542**	0.567**	0.576**	0.510**	0.438*	0.486*	0.528*	0.445*	0.546**	0.516*
	[0.264]	[0.257]	[0.269]	[0.235]	[0.260]	[0.261]	[0.269]	[0.227]	[0.263]	[0.271]
Ethnic	-0.243	-0.21	-0.172	-0.151	-0.281	-0.209	-0.218	-0.14	-0.254	-0.246
	[0.306]	[0.310]	[0.311]	[0.312]	[0.299]	[0.303]	[0.301]	[0.309]	[0.270]	[0.316]
Latitude	2.707***	2.592***	2.530***	2.941***	2.794***	2.706***	2.607***	2.890***	2.785***	2.825***
	[0.550]	[0.574]	[0.524]	[0.523]	[0.544]	[0.548]	[0.522]	[0.492]	[0.462]	[0.499]
SubSah	0.455**	0.391*	0.34	0.507**	0.508**	0.427**	0.437**	0.487**	0.572***	0.419**
	[0.202]	[0.214]	[0.205]	[0.205]	[0.202]	[0.211]	[0.191]	[0.209]	[0.210]	[0.187]
SSEAsia	0.335	0.328	0.269	0.490**	0.456**	0.431**	0.391*	0.545***	0.620***	0.333
	[0.226]	[0.220]	[0.211]	[0.207]	[0.205]	[0.195]	[0.209]	[0.192]	[0.201]	[0.212]
NCapXX80	0.000									
	[0.004]									
MFuelXX80		-0.002	-0.004							
		[0.004]	[0.003]							
FdAgXX80		0.003		0.003						
		[0.004]		[0.003]						
NCapXGDP80					0.006					
					[0.005]					
MFuelXGDP80						0.000	-0.002			
						[0.006]	[0.006]			
FdAgXGDP80						0.018**		0.021**		
						[0.009]		[0.009]		
Rent80									-0.002	
									[0.001]	
MFuelP80										0.001
										[0.001]
Constant	-3.728***	-4.130***	-3.581***	-4.518***	-4.469***	-4.783***	-4.192***	-5.132***	-4.916***	-3.409***
	[1.186]	[1.181]	[0.890]	[1.107]	[0.982]	[0.967]	[0.893]	[0.958]	[0.787]	[0.963]
Observations	75	75	76	79	73	73	74	77	91	76
Adj. R-squared	0.80	0.80	0.80	0.79	0.81	0.82	0.80	0.81	0.80	0.80

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors are in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance

Table III.4. Rule of Law and Natural Resources - Outlier Analysis

	A. Change in Data Set									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.377***	0.401***	0.349***	0.428***	0.349***	0.392***	0.351***	0.425***	0.408***	0.341***
	[0.097]	[0.099]	[0.091]	[0.103]	[0.090]	[0.098]	[0.095]	[0.088]	[0.086]	[0.094]
p60	0.533	0.449	0.442	0.179	0.476	0.272	0.48	0.011	0.076	0.484
	[0.412]	[0.422]	[0.437]	[0.378]	[0.423]	[0.444]	[0.415]	[0.374]	[0.349]	[0.412]
pi6064	0.158	0.152	0.192	0.224	0.14	0.265	0.203	0.302	-0.151	0.164
	[0.222]	[0.211]	[0.221]	[0.194]	[0.247]	[0.247]	[0.247]	[0.189]	[0.130]	[0.254]
malfal66	0.012	-0.06	-0.022	-0.036	0.057	-0.004	-0.003	-0.012	-0.18	0.008
	[0.278]	[0.275]	[0.302]	[0.277]	[0.290]	[0.261]	[0.297]	[0.242]	[0.254]	[0.295]
dens65c	0.028*	0.028*	0.026	0.027*	0.023*	0.023**	0.028	0.022**	0.022	0.027*
	[0.016]	[0.015]	[0.016]	[0.015]	[0.012]	[0.010]	[0.017]	[0.009]	[0.015]	[0.016]
dtt7090	-0.03	-0.008	-0.017	-0.004	-0.038	-0.006	-0.025	-0.005	-0.013	-0.032
	[0.027]	[0.037]	[0.036]	[0.029]	[0.027]	[0.036]	[0.031]	[0.024]	[0.019]	[0.023]
eurfrac	-0.079	-0.117	-0.105	-0.015	-0.039	-0.073	-0.094	0.018	0.056	-0.076
	[0.195]	[0.210]	[0.198]	[0.208]	[0.189]	[0.201]	[0.197]	[0.188]	[0.183]	[0.190]
engfrac	0.469*	0.489*	0.497*	0.441*	0.417	0.421	0.495*	0.366	0.591**	0.480*
	[0.255]	[0.246]	[0.278]	[0.234]	[0.275]	[0.265]	[0.280]	[0.237]	[0.257]	[0.273]
Ethnic	-0.335	-0.317	-0.24	-0.24	-0.331	-0.275	-0.255	-0.234	-0.266	-0.271
	[0.285]	[0.288]	[0.297]	[0.273]	[0.290]	[0.290]	[0.290]	[0.282]	[0.243]	[0.292]
Latitude	2.209***	2.141***	2.002***	2.133***	2.335***	2.235***	2.041***	2.367***	2.044***	2.125***
	[0.515]	[0.541]	[0.523]	[0.480]	[0.515]	[0.535]	[0.536]	[0.451]	[0.475]	[0.480]
SubSah	0.388	0.396	0.281	0.419	0.335	0.316	0.298	0.362	0.550*	0.297
	[0.314]	[0.302]	[0.318]	[0.308]	[0.312]	[0.276]	[0.316]	[0.276]	[0.290]	[0.316]
SSEAsia	0.543**	0.551**	0.440**	0.638***	0.496**	0.506***	0.462**	0.623***	0.645***	0.465**
	[0.217]	[0.214]	[0.207]	[0.202]	[0.206]	[0.189]	[0.206]	[0.180]	[0.215]	[0.208]
NCapXX80	0.003									
	[0.004]									
MFuelXX80		0.001	-0.002							
		[0.004]	[0.003]							
FdAgXX80		0.005		0.003						
		[0.004]		[0.003]						
NCapXGDP80					0.007					
					[0.005]					
MFuelXGDP80						-0.001	-0.002			
						[0.007]	[0.007]			
FdAgXGDP80						0.022**		0.024***		
						[0.009]		[0.009]		
Rent80									-0.001	
									[0.001]	
MFuelP80										0.000
										[0.001]
Constant	-3.930***	-4.037***	-3.362***	-4.073***	-3.618***	-3.862***	-3.475***	-4.068***	-3.470***	-3.426***
	[0.816]	[0.804]	[0.560]	[0.673]	[0.581]	[0.590]	[0.562]	[0.558]	[0.509]	[0.602]
Observations	68	68	69	72	68	68	69	72	85	69
Adjusted R-squared	0.82	0.82	0.82	0.82	0.82	0.83	0.82	0.84	0.82	0.82

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors arer in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.4 (continued). Rule of Law and Natural Resources - Outlier Analysis

	B. Without Singapore and Hongkong									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.345***	0.365***	0.340***	0.404***	0.343***	0.378***	0.352***	0.412***	0.397***	0.341***
	[0.094]	[0.097]	[0.087]	[0.100]	[0.089]	[0.097]	[0.092]	[0.092]	[0.087]	[0.091]
p60	0.494	0.436	0.418	0.188	0.489	0.326	0.441	0.059	0.071	0.468
	[0.409]	[0.418]	[0.418]	[0.381]	[0.404]	[0.431]	[0.396]	[0.383]	[0.355]	[0.404]
pi6064	0.249	0.237	0.259	0.278	0.245	0.325	0.322	0.319*	-0.129	0.272
	[0.218]	[0.210]	[0.212]	[0.193]	[0.227]	[0.232]	[0.225]	[0.188]	[0.136]	[0.232]
malfal66	0.09	0.033	0.048	0.056	0.094	0.038	0.05	0.046	-0.115	0.074
	[0.279]	[0.280]	[0.284]	[0.277]	[0.284]	[0.263]	[0.279]	[0.246]	[0.253]	[0.278]
dens65c	-0.064	-0.054	-0.072	-0.03	-0.066	-0.045	-0.059	-0.027	-0.042	-0.062
	[0.066]	[0.063]	[0.064]	[0.061]	[0.062]	[0.059]	[0.065]	[0.055]	[0.061]	[0.064]
dtt7090	-0.031	-0.015	-0.021	-0.016	-0.032	-0.007	-0.016	-0.012	-0.015	-0.033
	[0.026]	[0.035]	[0.034]	[0.028]	[0.027]	[0.036]	[0.032]	[0.025]	[0.018]	[0.023]
eurfrac	-0.101	-0.125	-0.126	0	-0.099	-0.112	-0.132	0.012	0.059	-0.103
	[0.195]	[0.207]	[0.200]	[0.208]	[0.192]	[0.196]	[0.198]	[0.192]	[0.187]	[0.191]
engfrac	0.473*	0.485**	0.494**	0.425*	0.469*	0.461*	0.511**	0.379*	0.574**	0.481*
	[0.246]	[0.241]	[0.246]	[0.224]	[0.250]	[0.247]	[0.251]	[0.225]	[0.235]	[0.244]
Ethnic	-0.428	-0.408	-0.388	-0.348	-0.429	-0.362	-0.374	-0.319	-0.344	-0.404
	[0.275]	[0.280]	[0.279]	[0.271]	[0.272]	[0.282]	[0.272]	[0.279]	[0.230]	[0.270]
Latitude	2.293***	2.243***	2.221***	2.327***	2.304***	2.228***	2.131***	2.438***	2.266***	2.317***
	[0.527]	[0.547]	[0.502]	[0.486]	[0.507]	[0.530]	[0.528]	[0.464]	[0.463]	[0.467]
SubSah	0.294	0.309	0.242	0.381	0.289	0.284	0.264	0.347	0.511*	0.265
	[0.319]	[0.310]	[0.302]	[0.306]	[0.308]	[0.280]	[0.299]	[0.280]	[0.291]	[0.302]
SSEAsia	0.529**	0.535**	0.497**	0.646***	0.527**	0.526***	0.506**	0.640***	0.678***	0.520**
	[0.215]	[0.212]	[0.207]	[0.196]	[0.207]	[0.192]	[0.204]	[0.179]	[0.210]	[0.206]
NCapXX80	0.000									
	[0.004]									
MFuelXX80		-0.001	-0.002							
		[0.004]	[0.003]							
FdAgXX80		0.002		0.002						
		[0.004]		[0.003]						
NCapXGDP80					0.001					
					[0.006]					
MFuelXGDP80						-0.005	-0.007			
						[0.007]	[0.007]			
FdAgXGDP80						0.014		0.018*		
						[0.010]		[0.010]		
Rent80									-0.001	
									[0.001]	
MFuelP80										0.000
										[0.001]
Constant	-3.451***	-3.571***	-3.244***	-3.865***	-3.428***	-3.658***	-3.394***	-3.939***	-3.402***	-3.403***
	[0.797]	[0.794]	[0.512]	[0.643]	[0.548]	[0.578]	[0.518]	[0.567]	[0.500]	[0.551]
Observations	66	66	67	70	66	66	67	70	83	67
Adjusted R-squared	0.83	0.83	0.83	0.82	0.83	0.83	0.83	0.83	0.82	0.83

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors arer in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.5. Interaction between Natural Resources and Ethnic Fractionalization

	A. All Variables										B. Simple									
	I	II	III	IV	V	VI	VII	VIII	IX	X	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.466***	0.461***	0.484***	0.492***	0.488***	0.516***	0.482***	0.558***	0.529***	0.476***	0.427***	0.421***	0.447***	0.472***	0.445***	0.499***	0.463***	0.508***	0.558***	0.467***
	[0.084]	[0.086]	[0.065]	[0.081]	[0.075]	[0.080]	[0.069]	[0.077]	[0.071]	[0.078]	[0.067]	[0.068]	[0.055]	[0.064]	[0.059]	[0.071]	[0.056]	[0.062]	[0.067]	[0.073]
p60	0.288	0.347	0.269	0.197	0.493	0.233	0.437	-0.301	-0.132	0.363	0.365	0.565*	0.524*	0.388	0.665**	0.36	0.521*	0.237	-0.13	0.493
	[0.406]	[0.420]	[0.403]	[0.365]	[0.392]	[0.455]	[0.380]	[0.406]	[0.352]	[0.395]	[0.289]	[0.319]	[0.308]	[0.275]	[0.314]	[0.391]	[0.295]	[0.277]	[0.353]	[0.371]
dens65c	0.018*	0.018*	0.020**	0.017	0.019**	0.019**	0.021*	0.016**	0.019**	0.020*	0.018*	0.018**	0.021***	0.019	0.020**	0.019**	0.026**	0.014**	0.021**	0.020*
	[0.010]	[0.010]	[0.008]	[0.012]	[0.008]	[0.009]	[0.011]	[0.007]	[0.009]	[0.010]	[0.010]	[0.009]	[0.008]	[0.012]	[0.009]	[0.008]	[0.011]	[0.007]	[0.010]	[0.010]
dtt7090	-0.018	0.011	0.01	-0.022	-0.018	0.008	-0.005	-0.02	-0.019	-0.032	-0.024	0.003	0.001	-0.027	-0.025	0.006	0.002	-0.02	-0.02	-0.038
	[0.034]	[0.040]	[0.038]	[0.031]	[0.033]	[0.040]	[0.035]	[0.032]	[0.023]	[0.030]	[0.025]	[0.032]	[0.031]	[0.023]	[0.027]	[0.034]	[0.029]	[0.021]	[0.023]	[0.027]
eurfrac	-0.482**	-0.434**	-0.479**	-0.417**	-0.553***	-0.495**	-0.514***	-0.427**	-0.445**	-0.477**	-0.467**	-0.421**	-0.467***	-0.356*	-0.543***	-0.495***	-0.487***	-0.378**	-0.401**	-0.493***
	[0.191]	[0.206]	[0.186]	[0.200]	[0.195]	[0.199]	[0.191]	[0.194]	[0.187]	[0.190]	[0.183]	[0.188]	[0.168]	[0.187]	[0.185]	[0.181]	[0.172]	[0.171]	[0.173]	[0.174]
engfrac	0.688**	0.714**	0.736**	0.726**	0.761**	0.722**	0.771**	0.648**	0.869***	0.760**	0.716**	0.731**	0.746***	0.724***	0.776***	0.794***	0.774***	0.717***	0.727***	0.739***
	[0.301]	[0.299]	[0.288]	[0.290]	[0.307]	[0.297]	[0.303]	[0.271]	[0.300]	[0.304]	[0.276]	[0.277]	[0.266]	[0.263]	[0.282]	[0.269]	[0.270]	[0.246]	[0.242]	[0.265]
Latitude																				
SubSah																				
SSEAsia																				
Ethnic	-0.665**	-0.537*	-0.614*	-0.25	-0.773**	-0.599*	-0.691**	-0.438	-0.505	-0.825***	-0.573**	-0.479*	-0.586**	-0.4	-0.628**	-0.531**	-0.555**	-0.524*	-0.584**	-0.645**
	[0.324]	[0.317]	[0.308]	[0.290]	[0.312]	[0.344]	[0.326]	[0.294]	[0.315]	[0.299]	[0.274]	[0.255]	[0.232]	[0.266]	[0.248]	[0.253]	[0.243]	[0.269]	[0.270]	[0.255]
NCapXX80	-0.004										-0.004									
	[0.004]										[0.004]									
E*NCapXX80	-0.011										-0.009									
	[0.009]										[0.008]									
MFuelXX80		-0.005	-0.004									-0.005	-0.004							
		[0.004]	[0.004]									[0.004]	[0.003]							
E*MFuelXX80		-0.020*	-0.021**									-0.019**	-0.019***							
		[0.011]	[0.008]									[0.009]	[0.007]							
FdAgXX80		-0.003		0.000								-0.003		0.000						
		[0.004]		[0.003]								[0.004]		[0.003]						
E*FdAgXX80		0.004		0.025***								0.004		0.022**						
		[0.011]		[0.009]								[0.010]		[0.009]						
NCapXGDP80					0.000										-0.001					
					[0.005]										[0.004]					
E*NCapXGDP80					-0.037**										-0.031**					
					[0.016]										[0.012]					
MFuelXGDP80						-0.006	-0.004									-0.008	-0.007			
						[0.010]	[0.009]									[0.007]	[0.006]			
E*MFuelXGDP80						-0.030	-0.043*									-0.021	-0.034***			
						[0.026]	[0.023]									[0.014]	[0.012]			
FdAgXGDP80						0.013		0.017*								0.015		0.018**		
						[0.011]		[0.009]								[0.009]		[0.009]		
E*FdAgXGDP80						0.034		0.064								0.033		0.056		
						[0.041]		[0.040]								[0.038]		[0.039]		
Rent80									-0.001										-0.000**	
									[0.001]										[0.000]	
E*Rent80									-0.005										-0.001	
									[0.004]										[0.001]	
MFuelP80										0.000										0.000
										[0.001]										[0.000]
E*MFuelP80										-0.006***										-0.002**
										[0.002]										[0.001]
Constant	-3.414***	-3.399***	-3.455***	-3.507***	-3.703***	-3.806***	-3.683***	-3.678***	-3.390***	-3.582***	-3.070***	-3.223***	-3.364***	-3.566***	-3.434***	-3.651***	-3.488***	-3.703***	-3.827***	-3.524***
	[0.594]	[0.560]	[0.448]	[0.499]	[0.508]	[0.523]	[0.459]	[0.507]	[0.464]	[0.541]	[0.481]	[0.443]	[0.338]	[0.397]	[0.360]	[0.386]	[0.332]	[0.397]	[0.386]	[0.419]
Observations	68	68	69	72	68	68	69	72	85	69	73	73	74	77	73	73	73	74	90	74
Adj. R-squared	0.78	0.79	0.80	0.78	0.78	0.79	0.79	0.77	0.77	0.78	0.78	0.80	0.80	0.77	0.78	0.78	0.80	0.79	0.76	0.78

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.5 (continued). Interaction between Natural Resources and Ethnic Fractionalization

	C. Adding Latitude and Regional Dummies									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.390***	0.392***	0.372***	0.405***	0.338***	0.369***	0.333***	0.420***	0.416***	0.313***
	[0.067]	[0.064]	[0.054]	[0.069]	[0.063]	[0.072]	[0.065]	[0.057]	[0.082]	[0.077]
p60	0.475*	0.602**	0.580**	0.358	0.676**	0.429	0.777**	-0.031	0.075	0.700**
	[0.283]	[0.272]	[0.267]	[0.249]	[0.291]	[0.381]	[0.329]	[0.229]	[0.334]	[0.344]
dens65c	0.028**	0.027**	0.026**	0.024	0.021**	0.021***	0.024**	0.022**	0.024	0.028*
	[0.014]	[0.013]	[0.012]	[0.016]	[0.009]	[0.007]	[0.011]	[0.009]	[0.015]	[0.015]
dtt7090	-0.017	-0.001	-0.001	0	-0.029	-0.01	-0.02	-0.002	-0.015	-0.029
	[0.023]	[0.024]	[0.023]	[0.020]	[0.023]	[0.028]	[0.026]	[0.017]	[0.018]	[0.021]
eurfrac	-0.046	-0.037	-0.032	0.032	-0.016	-0.006	-0.033	0.058	0.08	-0.023
	[0.181]	[0.182]	[0.172]	[0.175]	[0.184]	[0.182]	[0.183]	[0.157]	[0.185]	[0.178]
engfrac	0.497**	0.522**	0.528**	0.518**	0.473*	0.495**	0.535**	0.471**	0.484**	0.520**
	[0.213]	[0.228]	[0.236]	[0.217]	[0.243]	[0.244]	[0.254]	[0.210]	[0.209]	[0.231]
Latitude	2.073***	1.921***	1.812***	1.969***	2.256***	2.251***	2.040***	2.324***	2.182***	2.148***
	[0.483]	[0.487]	[0.419]	[0.411]	[0.482]	[0.480]	[0.472]	[0.363]	[0.469]	[0.448]
SubSah	0.562**	0.474**	0.454**	0.352*	0.523**	0.366*	0.487**	0.303	0.410**	0.409**
	[0.226]	[0.227]	[0.209]	[0.195]	[0.203]	[0.215]	[0.203]	[0.187]	[0.206]	[0.199]
SSEAsia	0.586***	0.574***	0.531***	0.579***	0.543***	0.485**	0.497**	0.560***	0.670***	0.460**
	[0.213]	[0.210]	[0.197]	[0.206]	[0.199]	[0.190]	[0.199]	[0.186]	[0.213]	[0.205]
Ethnic	-0.548**	-0.440	-0.427*	-0.173	-0.501**	-0.302	-0.452*	-0.133	-0.310	-0.348
	[0.250]	[0.271]	[0.240]	[0.269]	[0.245]	[0.270]	[0.241]	[0.263]	[0.246]	[0.261]
NCapXX80	0.002									
	[0.004]									
E*NCapXX80	-0.01									
	[0.009]									
MFuelXX80		0.001	-0.001							
		[0.004]	[0.003]							
E*MFuelXX80		-0.017*	-0.020***							
		[0.009]	[0.007]							
FdAgXX80		0.003		0.002						
		[0.004]		[0.003]						
E*FdAgXX80		0.002		0.015*						
		[0.011]		[0.008]						
NCapXGDP80					0.007*					
					[0.004]					
E*NCapXGDP80					-0.028**					
					[0.012]					
MFuelXGDP80						0.004	0.004			
						[0.006]	[0.005]			
E*MFuelXGDP80						-0.021	-0.038***			
						[0.014]	[0.012]			
FdAgXGDP80						0.021**		0.027***		
						[0.009]		[0.007]		
E*FdAgXGDP80						0.038		0.055*		
						[0.038]		[0.032]		
Rent80									0.000	
									[0.000]	
E*Rent80									-0.001	
									[0.001]	
MFuelP80										0.000
										[0.000]
E*MFuelP80										-0.002***
										[0.001]
Constant	-3.834***	-3.886***	-3.679***	-3.869***	-3.640***	-3.657***	-3.605***	-3.750***	-3.840***	-3.442***
	[0.536]	[0.520]	[0.424]	[0.461]	[0.454]	[0.430]	[0.419]	[0.405]	[0.438]	[0.453]
Observations	73	73	74	77	73	73	74	77	90	74
Adj. R-squared	0.83	0.84	0.84	0.83	0.84	0.85	0.84	0.85	0.83	0.83

Dependent variable is average Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.6. Marginal Effect of Natural Resources on Rule of Law (Ethnic Fractionalization)

Percentile	Value	MFuelXX80		MFuelXGDP80		Rent80		MFuelP80		FdAgXX80		FdAgXGDP80		NCapXX80		NCapXGDP80	
	Ethnic	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err
5	0.047	0.004	0.004	0.014	0.008	0.217	0.392	0.951**	0.43	-0.005	0.005	0.002	0.014	0.003	0.004	0.016***	0.006
10	0.093	0.004	0.004	0.012	0.008	0.177	0.369	0.870**	0.406	-0.004	0.005	0.005	0.013	0.003	0.004	0.015***	0.006
15	0.115	0.003	0.004	0.012	0.008	0.165	0.363	0.845**	0.399	-0.004	0.005	0.006	0.013	0.003	0.004	0.015***	0.005
20	0.169	0.003	0.004	0.010	0.007	0.122	0.339	0.756**	0.375	-0.003	0.004	0.01	0.011	0.003	0.004	0.014***	0.005
25	0.217	0.002	0.004	0.009	0.007	0.097	0.326	0.705*	0.361	-0.002	0.004	0.011	0.011	0.003	0.004	0.013***	0.005
30	0.274	0.001	0.004	0.007	0.007	0.042	0.299	0.592*	0.333	-0.001	0.004	0.016*	0.009	0.002	0.004	0.011**	0.005
35	0.344	0.000	0.003	0.005	0.006	-0.022	0.271	0.462	0.304	0.000	0.003	0.021**	0.008	0.002	0.004	0.010**	0.004
40	0.413	-0.001	0.003	0.003	0.006	-0.084	0.248	0.333	0.28	0.002	0.003	0.026***	0.007	0.001	0.004	0.008*	0.004
45	0.463	-0.002	0.003	0.002	0.006	-0.101	0.243	0.299	0.274	0.002	0.003	0.027***	0.007	0.001	0.004	0.008*	0.004
50	0.504	-0.003	0.003	0.000	0.005	-0.160	0.229	0.179	0.259	0.003	0.003	0.031***	0.007	0.001	0.004	0.006	0.004
55	0.542	-0.004	0.003	-0.002	0.005	-0.208	0.222	0.081	0.251	0.004*	0.002	0.035***	0.007	0.001	0.004	0.005	0.005
60	0.601	-0.004	0.003	-0.002	0.005	-0.221	0.221	0.053	0.25	0.005*	0.002	0.036***	0.008	0.001	0.004	0.004	0.005
65	0.655	-0.006**	0.003	-0.005	0.005	-0.300	0.223	-0.109	0.25	0.006**	0.002	0.042***	0.009	0.000	0.004	0.002	0.005
70	0.674	-0.006**	0.003	-0.006	0.005	-0.311	0.224	-0.132	0.251	0.007***	0.002	0.043***	0.009	0.000	0.004	0.002	0.005
75	0.710	-0.007**	0.003	-0.007	0.005	-0.340	0.229	-0.191	0.255	0.007***	0.002	0.045***	0.01	0.000	0.005	0.001	0.005
80	0.735	-0.007**	0.003	-0.007	0.005	-0.358	0.232	-0.228	0.258	0.008***	0.003	0.047***	0.011	0.000	0.005	0.001	0.006
85	0.781	-0.008***	0.003	-0.009	0.005	-0.405	0.245	-0.324	0.27	0.009***	0.003	0.051***	0.012	0.000	0.005	-0.001	0.006
90	0.819	-0.008***	0.003	-0.010*	0.006	-0.438*	0.256	-0.393	0.281	0.009***	0.003	0.053***	0.013	-0.001	0.005	-0.001	0.006
95	0.863	-0.009***	0.003	-0.012**	0.006	-0.485*	0.274	-0.488	0.298	0.010***	0.003	0.057***	0.014	-0.001	0.006	-0.003	0.007
DoF		61		61		77		62		66		65		61		61	

Ethnic refers to ethnic fractionalization. Marg. Effect is the estimated marginal effect of natural resource variable on Rule of Law. Estimates are obtained from specification C of Table III.5. DoF is Degrees of Freedom. Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.7. Marginal Effect of Ethnic Fractionalization on Rule of Law (Natural Resources)

Percentile	MFuelXX80			MFuelXGDP80			Rent80			MFuelP80			FdAgXX80			FdAgXGDP80			NCapXX80			NCapXGDP80		
	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.
5	0.22	0.146	0.299	0.01	-0.086	0.28	0.00	-0.264	0.264	0.00	-0.239	0.282	0.78	-0.745**	0.316	1.15	-0.337	0.338	10.09	-0.002	0.554	2.48	-0.104	0.317
10	1.49	0.121	0.294	0.24	-0.094	0.278	0.06	-0.264	0.264	0.24	-0.239	0.282	3.51	-0.704**	0.302	1.37	-0.326	0.335	20.97	-0.110	0.465	2.65	-0.109	0.316
15	3.07	0.09	0.288	0.36	-0.099	0.278	0.22	-0.264	0.264	0.43	-0.239	0.282	8.18	-0.635**	0.282	1.87	-0.300	0.328	26.32	-0.164	0.423	3.77	-0.141	0.308
20	3.49	0.082	0.286	0.56	-0.107	0.276	0.39	-0.264	0.264	0.61	-0.240	0.282	11.20	-0.590**	0.27	2.09	-0.288	0.325	31.15	-0.212	0.387	4.48	-0.161	0.302
25	5.35	0.045	0.28	0.77	-0.114	0.275	0.89	-0.265	0.263	1.34	-0.241	0.282	12.03	-0.577**	0.268	2.65	-0.259	0.318	41.10	-0.311	0.321	5.40	-0.187	0.296
30	6.01	0.032	0.278	1.10	-0.127	0.273	1.17	-0.265	0.263	1.90	-0.242	0.281	15.69	-0.523**	0.257	2.86	-0.248	0.316	46.05	-0.361	0.294	6.46	-0.217	0.288
35	7.24	0.008	0.274	1.16	-0.129	0.273	1.63	-0.266	0.263	2.54	-0.243	0.281	19.52	-0.466*	0.249	3.29	-0.226	0.312	52.52	-0.425	0.267	8.19	-0.267	0.278
40	8.19	-0.011	0.271	1.34	-0.136	0.272	2.28	-0.266	0.263	3.37	-0.245	0.281	22.33	-0.424*	0.246	3.76	-0.201	0.309	64.16	-0.541**	0.249	9.75	-0.311	0.269
45	9.02	-0.027	0.268	2.12	-0.166	0.267	2.75	-0.267	0.263	5.15	-0.248	0.28	23.38	-0.409	0.245	4.12	-0.182	0.307	67.91	-0.579**	0.254	11.16	-0.351	0.262
50	12.43	-0.095	0.259	2.68	-0.186	0.265	4.21	-0.268	0.262	7.74	-0.252	0.279	31.08	-0.294	0.249	4.86	-0.143	0.305	73.74	-0.637**	0.270	13.41	-0.416	0.253
55	17.04	-0.186	0.249	3.72	-0.226	0.259	6.23	-0.27	0.262	8.90	-0.254	0.279	38.45	-0.185	0.267	5.97	-0.086	0.306	76.82	-0.668**	0.282	14.02	-0.433*	0.251
60	23.94	-0.322	0.241	4.82	-0.268	0.255	7.91	-0.271	0.261	10.54	-0.257	0.278	45.14	-0.086	0.292	6.35	-0.066	0.308	80.96	-0.709**	0.302	15.04	-0.462*	0.248
65	28.14	-0.404*	0.24	6.68	-0.338	0.248	12.86	-0.276	0.259	14.30	-0.264	0.277	51.91	0.015	0.326	7.36	-0.013	0.315	86.21	-0.762**	0.333	16.13	-0.493**	0.246
70	34.91	-0.538**	0.246	7.85	-0.382	0.245	16.83	-0.28	0.258	16.96	-0.268	0.276	61.08	0.151	0.379	8.90	0.067	0.334	89.05	-0.790**	0.351	18.93	-0.573**	0.243
75	56.11	-0.956***	0.307	11.16	-0.508**	0.24	24.87	-0.287	0.255	19.71	-0.273	0.275	65.11	0.211	0.404	9.78	0.113	0.348	89.61	-0.795**	0.355	20.22	-0.610**	0.243
80	65.38	-1.139***	0.349	14.11	-0.619**	0.241	33.14	-0.295	0.252	33.23	-0.297	0.271	71.19	0.301	0.445	12.92	0.277	0.415	93.30	-0.832**	0.38	22.24	-0.667***	0.245
85	73.30	-1.295***	0.389	19.37	-0.818***	0.256	41.82	-0.303	0.249	45.36	-0.318	0.267	76.54	0.381	0.481	13.48	0.306	0.43	94.95	-0.849**	0.392	27.40	-0.814***	0.262
90	85.83	-1.543***	0.457	29.04	-1.185***	0.318	88.29	-0.346	0.234	124.69	-0.456*	0.246	84.15	0.494	0.535	17.40	0.511	0.54	97.05	-0.870**	0.408	32.65	-0.964***	0.293
95	97.90	-1.781***	0.527	50.78	-2.008***	0.53	239.42	-0.486**	0.207	312.66	-0.785***	0.237	93.26	0.629	0.602	23.93	0.851	0.748	99.04	-0.890**	0.423	61.52	-1.786***	0.572
DoF	61			61			77			62			64			62			61			61		

Marg. Effect is estimated marginal effect of ethnic fractionalization on Rule of Law. Estimates are obtained from specification C of Table III.5. DoF is Degrees of Freedom. Rent80 and MFuelP80 are expressed in USD thousands. Percentiles for Rent80 and MFuelP80 have been calculated on positive observations. Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.8. Openness

	A. Years Open 1970-1979 (Sachs and Warner)								B. Black Market Premium							
lrgdpWDI	0.294***	0.286***	0.328***	0.291***	0.248***	0.352***	0.351***	0.236***	0.343***	0.319***	0.377***	0.339***	0.293***	0.391***	0.424***	0.290***
	[0.085]	[0.066]	[0.080]	[0.090]	[0.079]	[0.072]	[0.093]	[0.085]	[0.083]	[0.072]	[0.081]	[0.082]	[0.077]	[0.066]	[0.091]	[0.089]
p60	0.570**	0.610**	0.304	0.462	0.768**	-0.024	0.064	0.657**	0.560*	0.546*	0.325	0.316	0.728**	-0.091	-0.046	0.607*
	[0.246]	[0.240]	[0.225]	[0.367]	[0.299]	[0.222]	[0.324]	[0.311]	[0.282]	[0.275]	[0.246]	[0.385]	[0.322]	[0.231]	[0.340]	[0.349]
dens65c	0.026**	0.024**	0.024	0.020***	0.022**	0.021**	0.022	0.026*	0.030**	0.029**	0.027	0.024***	0.027**	0.024***	0.024	0.030*
	[0.011]	[0.011]	[0.015]	[0.007]	[0.010]	[0.009]	[0.015]	[0.014]	[0.014]	[0.013]	[0.016]	[0.008]	[0.013]	[0.009]	[0.016]	[0.015]
dtt7090	-0.014	-0.013	-0.013	-0.025	-0.034	-0.013	-0.02	-0.038*	0.012	0.011	0.01	0.003	-0.006	0.007	-0.011	-0.018
	[0.023]	[0.022]	[0.021]	[0.029]	[0.026]	[0.018]	[0.017]	[0.020]	[0.028]	[0.026]	[0.022]	[0.031]	[0.029]	[0.018]	[0.019]	[0.024]
engfrac	0.508*	0.514*	0.503**	0.480*	0.508*	0.463**	0.457*	0.506*	0.491**	0.497**	0.477**	0.456*	0.506*	0.424*	0.452**	0.481**
	[0.261]	[0.267]	[0.235]	[0.260]	[0.282]	[0.222]	[0.230]	[0.256]	[0.236]	[0.246]	[0.221]	[0.256]	[0.267]	[0.217]	[0.210]	[0.238]
eurfrac	-0.09	-0.066	0.000	-0.035	-0.053	0.025	0.077	-0.052	-0.014	-0.008	0.072	0.028	-0.013	0.101	0.096	0.000
	[0.183]	[0.171]	[0.175]	[0.186]	[0.182]	[0.157]	[0.182]	[0.174]	[0.183]	[0.172]	[0.174]	[0.180]	[0.185]	[0.152]	[0.183]	[0.178]
Latitude	1.697***	1.571***	1.828***	2.107***	1.856***	2.174***	2.034***	1.895***	2.038***	1.932***	2.054***	2.345***	2.092***	2.442***	2.142***	2.184***
	[0.531]	[0.437]	[0.405]	[0.517]	[0.493]	[0.379]	[0.467]	[0.447]	[0.531]	[0.483]	[0.471]	[0.532]	[0.528]	[0.423]	[0.525]	[0.506]
SubSah	0.387*	0.368*	0.273	0.314	0.404**	0.252	0.381*	0.330*	0.35	0.324	0.274	0.239	0.355	0.21	0.381*	0.294
	[0.206]	[0.190]	[0.173]	[0.200]	[0.189]	[0.176]	[0.205]	[0.185]	[0.237]	[0.222]	[0.212]	[0.213]	[0.220]	[0.187]	[0.217]	[0.220]
SSEAsia	0.327	0.307	0.389*	0.325	0.291	0.411*	0.523**	0.255	0.474**	0.425*	0.527**	0.411**	0.400*	0.505***	0.650***	0.390*
	[0.257]	[0.226]	[0.228]	[0.224]	[0.229]	[0.211]	[0.231]	[0.235]	[0.233]	[0.218]	[0.222]	[0.198]	[0.219]	[0.189]	[0.224]	[0.222]
Openness	0.439**	0.403**	0.361**	0.323*	0.386**	0.301*	0.333*	0.393**	-0.137	-0.140	-0.118	-0.129	-0.141	-0.118	-0.092	-0.123
	[0.178]	[0.167]	[0.161]	[0.170]	[0.177]	[0.152]	[0.170]	[0.179]	[0.092]	[0.091]	[0.087]	[0.084]	[0.086]	[0.083]	[0.059]	[0.086]
Ethnic	-0.523**	-0.446**	-0.220	-0.366	-0.473**	-0.188	-0.321	-0.385	-0.417	-0.399	-0.15	-0.253	-0.417*	-0.096	-0.27	-0.314
	[0.231]	[0.205]	[0.248]	[0.268]	[0.222]	[0.260]	[0.235]	[0.242]	[0.272]	[0.246]	[0.264]	[0.275]	[0.240]	[0.262]	[0.247]	[0.256]
MFuelXX80	0.001	0.000							0.001	-0.001						
	[0.004]	[0.003]							[0.004]	[0.003]						
E*MFuelXX80	-0.019**	-0.019***							-0.016*	-0.018***						
	[0.008]	[0.006]							[0.009]	[0.006]						
FdAgXX80	0.002		0.002						0.003		0.002					
	[0.005]		[0.003]						[0.004]		[0.003]					
E*FdAgXX80	-0.006		0.01						0.001		0.014*					
	[0.010]		[0.008]						[0.011]		[0.008]					
MFuelXGDP80				0.005	0.006							0.003	0.004			
				[0.006]	[0.006]							[0.007]	[0.006]			
E*MFuelXGDP80				-0.021	-0.033***							-0.018	-0.037***			
				[0.013]	[0.011]							[0.013]	[0.012]			
FdAgXGDP80				0.018*		0.023***						0.023**		0.027***		
				[0.009]		[0.008]						[0.008]		[0.007]		
E*FdAgXGDP80				0.02		0.037						0.039		0.054*		
				[0.039]		[0.034]						[0.037]		[0.032]		
Rent80							0.000								0.000	
							[0.000]								[0.000]	
E*Rent80							-0.001								-0.001	
							[0.001]								[0.001]	
MFuelP80								0.000								0.000
								[0.000]								[0.000]
E*MFuelP80								-0.001*								-0.002**
								[0.001]								[0.001]
Constant	-3.114***	-3.055***	-3.275***	-3.116***	-2.982***	-3.263***	-3.389***	-2.833***	-3.421***	-3.190***	-3.604***	-3.295***	-3.181***	-3.466***	-3.750***	-3.127***
	[0.695]	[0.500]	[0.558]	[0.551]	[0.526]	[0.503]	[0.523]	[0.554]	[0.637]	[0.527]	[0.542]	[0.499]	[0.526]	[0.452]	[0.490]	[0.558]
Observations	72	73	76	72	73	76	88	73	69	70	73	69	70	73	85	70
Adj. R-squared	0.85	0.86	0.84	0.85	0.85	0.85	0.83	0.84	0.84	0.85	0.84	0.86	0.84	0.86	0.83	0.83

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.8 (continued). Openness

	C. Own-import weighted tariff rates on intermediate inputs and capital goods (OWTI)								D. Own-import weighted non-tariff frequency on intermediate inputs and capital goods (OWQI)							
lrgdpWDI	0.384***	0.383***	0.391***	0.352***	0.324***	0.413***	0.418***	0.310***	0.407***	0.417***	0.413***	0.351***	0.338***	0.429***	0.437***	0.331***
	[0.075]	[0.061]	[0.080]	[0.084]	[0.076]	[0.068]	[0.115]	[0.095]	[0.081]	[0.073]	[0.088]	[0.094]	[0.084]	[0.080]	[0.117]	[0.106]
p60	0.732**	0.786**	0.41	0.534	0.959**	-0.042	0.173	0.846**	0.693**	0.717**	0.382	0.598	0.947**	-0.025	0.119	0.839**
	[0.317]	[0.295]	[0.345]	[0.420]	[0.359]	[0.289]	[0.446]	[0.395]	[0.322]	[0.301]	[0.362]	[0.453]	[0.360]	[0.304]	[0.453]	[0.389]
dens65c	0.027**	0.027**	0.026	0.024***	0.025**	0.024***	0.025	0.030*	0.025*	0.026*	0.025	0.022***	0.024**	0.023**	0.026	0.030*
	[0.013]	[0.013]	[0.017]	[0.007]	[0.011]	[0.008]	[0.017]	[0.016]	[0.013]	[0.013]	[0.017]	[0.007]	[0.011]	[0.009]	[0.017]	[0.015]
dtt7090	0.002	0.004	-0.003	-0.015	-0.028	0.001	-0.017	-0.028	-0.01	-0.008	-0.01	-0.027	-0.037	0.000	-0.015	-0.026
	[0.031]	[0.030]	[0.027]	[0.031]	[0.029]	[0.019]	[0.021]	[0.026]	[0.031]	[0.030]	[0.027]	[0.031]	[0.028]	[0.019]	[0.021]	[0.025]
engfrac	0.454*	0.452*	0.409*	0.327	0.398	0.33	0.395*	0.411*	0.36	0.377	0.33	0.262	0.273	0.329	0.327	0.334
	[0.264]	[0.255]	[0.224]	[0.250]	[0.270]	[0.212]	[0.223]	[0.237]	[0.259]	[0.248]	[0.221]	[0.259]	[0.253]	[0.219]	[0.219]	[0.224]
eurfrac	-0.059	-0.046	0.063	0.034	0.001	0.097	0.079	-0.008	-0.002	0.018	0.075	0.086	0.071	0.094	0.089	0.018
	[0.210]	[0.197]	[0.189]	[0.206]	[0.207]	[0.173]	[0.212]	[0.197]	[0.219]	[0.209]	[0.187]	[0.216]	[0.217]	[0.172]	[0.214]	[0.205]
Latitude	1.881***	1.904***	2.176***	2.640***	2.357***	2.586***	2.288***	2.328***	1.917***	2.037***	2.163***	2.747***	2.565***	2.544***	2.288***	2.370***
	[0.617]	[0.525]	[0.478]	[0.590]	[0.606]	[0.419]	[0.584]	[0.540]	[0.580]	[0.506]	[0.471]	[0.587]	[0.589]	[0.391]	[0.581]	[0.524]
SubSah	0.636**	0.552**	0.424*	0.458*	0.650***	0.372*	0.429*	0.547**	0.788***	0.714**	0.535*	0.617**	0.774***	0.453*	0.457*	0.620***
	[0.247]	[0.247]	[0.248]	[0.247]	[0.219]	[0.222]	[0.218]	[0.212]	[0.291]	[0.283]	[0.276]	[0.285]	[0.237]	[0.237]	[0.235]	[0.221]
SSEAsia	0.534**	0.518**	0.587**	0.455**	0.509**	0.561***	0.679***	0.453*	0.648**	0.675**	0.651**	0.601**	0.634**	0.636***	0.717***	0.536**
	[0.249]	[0.228]	[0.225]	[0.209]	[0.231]	[0.202]	[0.228]	[0.233]	[0.272]	[0.256]	[0.243]	[0.236]	[0.239]	[0.225]	[0.238]	[0.239]
Openness	0.186	0.236	0.097	0.391	0.223	0.23	0.083	0.197	0.348	0.366	0.384	0.334	0.411	0.283	0.236	0.349
	[0.326]	[0.302]	[0.379]	[0.320]	[0.322]	[0.380]	[0.368]	[0.326]	[0.280]	[0.284]	[0.267]	[0.284]	[0.262]	[0.296]	[0.272]	[0.278]
Ethnic	-0.396	-0.317	-0.135	-0.338	-0.376	-0.197	-0.179	-0.286	-0.366	-0.331	-0.114	-0.348	-0.357	-0.2	-0.163	-0.243
	[0.338]	[0.268]	[0.340]	[0.304]	[0.267]	[0.299]	[0.255]	[0.284]	[0.327]	[0.268]	[0.325]	[0.296]	[0.266]	[0.283]	[0.255]	[0.278]
MFuelXX80	-0.001	0.000							0.000	0.002						
	[0.005]	[0.003]							[0.005]	[0.004]						
E*MFuelXX80	-0.025**	-0.022***							-0.025**	-0.021***						
	[0.010]	[0.007]							[0.010]	[0.008]						
FdAgXX80	-0.001		0.001						-0.002		-0.001					
	[0.005]		[0.003]						[0.005]		[0.004]					
E*FdAgXX80	-0.008		0.012						-0.007		0.011					
	[0.013]		[0.011]						[0.012]		[0.010]					
MFuelXGDP80				0.007	0.009							0.01	0.012**			
				[0.007]	[0.006]							[0.007]	[0.006]			
E*MFuelXGDP80				-0.024	-0.040***							-0.027*	-0.040***			
				[0.015]	[0.013]							[0.016]	[0.013]			
FdAgXGDP80				0.024***		0.029***						0.019*		0.026***		
				[0.009]		[0.008]						[0.010]		[0.009]		
E*FdAgXGDP80				0.009		0.019						-0.003		0.011		
				[0.045]		[0.041]						[0.045]		[0.039]		
Rent80							0.000								0.000	
							[0.000]								[0.000]	
E*Rent80							-0.001								-0.001	
							[0.001]								[0.001]	
MFuelP80								0.000								0.000
								[0.000]								[0.000]
E*MFuelP80								-0.002**								-0.002***
								[0.001]								[0.001]
Constant	-3.903***	-3.964***	-3.891***	-3.787***	-3.806***	-3.816***	-3.974***	-3.609***	-4.160***	-4.322***	-4.129***	-3.918***	-4.075***	-3.985***	-4.126***	-3.853***
	[0.651]	[0.499]	[0.559]	[0.538]	[0.501]	[0.520]	[0.614]	[0.595]	[0.704]	[0.629]	[0.598]	[0.616]	[0.584]	[0.575]	[0.634]	[0.688]
Observations	64	64	66	64	64	66	73	64	63	63	65	63	63	65	72	63
Adj. R-squared	0.83	0.83	0.81	0.84	0.83	0.83	0.82	0.82	0.82	0.83	0.81	0.84	0.83	0.83	0.82	0.82

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.9. Past Institutions

	A. Legal Origin										B. Legal Origin and religion									
	I	II	III	IV	V	VI	VII	VIII	IX	X	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.353***	0.359***	0.332***	0.376***	0.295***	0.331***	0.296***	0.385***	0.417***	0.282***	0.348***	0.354***	0.333***	0.375***	0.290***	0.329***	0.295***	0.383***	0.405***	0.287***
	[0.066]	[0.066]	[0.057]	[0.068]	[0.066]	[0.075]	[0.069]	[0.059]	[0.086]	[0.084]	[0.066]	[0.065]	[0.058]	[0.068]	[0.066]	[0.071]	[0.067]	[0.058]	[0.087]	[0.082]
p60	0.594**	0.670**	0.648**	0.392*	0.747**	0.5	0.817**	0.034	-0.023	0.715*	0.622**	0.721**	0.767**	0.565**	0.893***	0.599	1.001***	0.172	0.199	1.050**
	[0.259]	[0.267]	[0.274]	[0.226]	[0.287]	[0.388]	[0.343]	[0.233]	[0.335]	[0.364]	[0.307]	[0.309]	[0.298]	[0.270]	[0.311]	[0.404]	[0.360]	[0.273]	[0.412]	[0.438]
dens65c	0.034**	0.033**	0.029**	0.025	0.024**	0.024***	0.027**	0.024***	0.022	0.030*	0.033***	0.032***	0.027**	0.024	0.021***	0.021***	0.025**	0.021***	0.02	0.028**
	[0.013]	[0.012]	[0.013]	[0.016]	[0.009]	[0.008]	[0.012]	[0.009]	[0.016]	[0.015]	[0.012]	[0.012]	[0.012]	[0.015]	[0.008]	[0.006]	[0.010]	[0.007]	[0.015]	[0.013]
dtt7090	-0.016	-0.001	0.000	0.007	-0.024	-0.008	-0.015	0.003	-0.006	-0.023	-0.016	-0.002	-0.004	-0.002	-0.035	-0.016	-0.023	-0.003	-0.013	-0.032
	[0.023]	[0.025]	[0.025]	[0.022]	[0.025]	[0.030]	[0.028]	[0.018]	[0.021]	[0.024]	[0.024]	[0.025]	[0.025]	[0.024]	[0.026]	[0.030]	[0.028]	[0.020]	[0.022]	[0.025]
engfrac	0.293	0.390	0.430	0.281	0.398	0.487	0.449	0.356	0.22	0.392	0.259	0.393	0.42	0.118	0.278	0.358	0.385	0.173	0.108	0.321
	[0.306]	[0.328]	[0.337]	[0.280]	[0.333]	[0.327]	[0.348]	[0.275]	[0.276]	[0.328]	[0.286]	[0.301]	[0.304]	[0.279]	[0.303]	[0.305]	[0.318]	[0.273]	[0.292]	[0.307]
eurfrac	0.000	-0.018	0.011	0.096	0.001	-0.015	-0.002	0.081	0.133	0.016	0.153	0.097	0.143	0.345	0.266	0.234	0.2	0.345*	0.355	0.257
	[0.181]	[0.190]	[0.176]	[0.185]	[0.179]	[0.183]	[0.182]	[0.166]	[0.185]	[0.178]	[0.199]	[0.211]	[0.197]	[0.211]	[0.181]	[0.196]	[0.199]	[0.188]	[0.214]	[0.189]
LOrFr	-0.260*	-0.191	-0.152	-0.252*	-0.142	-0.075	-0.143	-0.16	-0.293**	-0.174	-0.238	-0.187	-0.159	-0.214	-0.100	-0.041	-0.129	-0.107	-0.221	-0.129
	[0.149]	[0.155]	[0.149]	[0.132]	[0.155]	[0.156]	[0.159]	[0.132]	[0.140]	[0.170]	[0.166]	[0.169]	[0.165]	[0.153]	[0.164]	[0.158]	[0.170]	[0.143]	[0.153]	[0.183]
LOrGe	0.32	0.336	0.246	0.016	0.292	0.313	0.238	0.18	-0.026	0.183	0.334	0.366	0.251	0.006	0.300	0.315	0.242	0.160	-0.031	0.205
	[0.259]	[0.258]	[0.253]	[0.260]	[0.290]	[0.278]	[0.286]	[0.243]	[0.253]	[0.305]	[0.283]	[0.282]	[0.267]	[0.269]	[0.292]	[0.283]	[0.292]	[0.257]	[0.279]	[0.306]
LOrSc	-0.076	-0.026	0.08	-0.046	0.019	0.048	0.065	0.006	-0.059	0.012	0.378	0.459	0.547	0.183	0.441	0.444	0.516	0.292	0.190	0.462
	[0.242]	[0.249]	[0.212]	[0.158]	[0.195]	[0.175]	[0.200]	[0.160]	[0.188]	[0.194]	[0.469]	[0.466]	[0.529]	[0.460]	[0.443]	[0.406]	[0.511]	[0.402]	[0.493]	[0.522]
Prot											-0.008	-0.008	-0.007	-0.004	-0.007	-0.007	-0.007	-0.006	-0.005	-0.007
											[0.005]	[0.005]	[0.006]	[0.006]	[0.005]	[0.005]	[0.006]	[0.005]	[0.006]	[0.006]
Cath											-0.004*	-0.003	-0.003	-0.005**	-0.005**	-0.005**	-0.004*	-0.006***	-0.005**	-0.004*
											[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Muslim											-0.002	-0.002	-0.001	0.000	-0.001	-0.002	-0.001	-0.002	-0.001	0.000
											[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]
Years Open																				
Latitude	2.180***	2.030***	1.751***	1.916***	2.194***	2.204***	1.957***	2.240***	1.894***	2.056***	2.272***	2.115***	1.806***	1.892***	2.325***	2.333***	2.008***	2.248***	1.839***	2.023***
	[0.518]	[0.539]	[0.437]	[0.413]	[0.499]	[0.512]	[0.499]	[0.368]	[0.470]	[0.464]	[0.538]	[0.558]	[0.466]	[0.429]	[0.534]	[0.549]	[0.531]	[0.372]	[0.480]	[0.490]
SubSah	0.485**	0.419*	0.385*	0.302	0.433**	0.304	0.404*	0.246	0.291	0.331	0.487**	0.446*	0.427*	0.302	0.445**	0.308	0.455**	0.214	0.328	0.394*
	[0.231]	[0.232]	[0.222]	[0.213]	[0.216]	[0.225]	[0.216]	[0.202]	[0.201]	[0.213]	[0.224]	[0.232]	[0.227]	[0.203]	[0.209]	[0.227]	[0.212]	[0.196]	[0.208]	[0.200]
SSEAsia	0.416**	0.433**	0.388*	0.415**	0.384*	0.371*	0.350*	0.419**	0.482**	0.310	0.350*	0.371**	0.334*	0.343*	0.326*	0.312*	0.298	0.315*	0.407**	0.255
	[0.201]	[0.204]	[0.197]	[0.197]	[0.205]	[0.190]	[0.202]	[0.178]	[0.202]	[0.204]	[0.181]	[0.183]	[0.179]	[0.180]	[0.181]	[0.165]	[0.181]	[0.161]	[0.187]	[0.183]
EthnicII	-0.524**	-0.449*	-0.373	-0.183	-0.436*	-0.267	-0.389	-0.123	-0.337	-0.304	-0.419*	-0.366	-0.267	-0.119	-0.308	-0.161	-0.276	-0.054	-0.326	-0.151
	[0.241]	[0.265]	[0.239]	[0.270]	[0.248]	[0.279]	[0.245]	[0.276]	[0.261]	[0.265]	[0.245]	[0.264]	[0.250]	[0.272]	[0.255]	[0.279]	[0.253]	[0.276]	[0.281]	[0.278]
NCapXX80	0.005										0.005									
	[0.004]										[0.004]									
E*NCapXX80	-0.011										-0.013									
	[0.010]										[0.010]									
MFuelXX80		0.004	0.000									0.004	0.001							
		[0.005]	[0.003]									[0.004]	[0.003]							
E*MFuelXX80		-0.017*	-0.020***									-0.019*	-0.020***							
		[0.009]	[0.007]									[0.010]	[0.007]							
FdAgXX80		0.005		0.002								0.005		0.002						
		[0.005]		[0.003]								[0.005]		[0.003]						
E*FdAgXX80		-0.003		0.012								-0.006		0.009						
		[0.011]		[0.009]								[0.012]		[0.008]						
NCapXGDP80					0.009**										0.010**					
					[0.004]										[0.004]					
E*NCapXGDP80					-0.030**										-0.033***					
					[0.013]										[0.011]					
MFuelXGDP80						0.005	0.005									0.006	0.006			
						[0.007]	[0.006]									[0.006]	[0.006]			
E*MFuelXGDP80						-0.024	-0.037**									-0.025*	-0.037***			
						[0.015]	[0.014]									[0.013]	[0.012]			
FdAgXGDP80						0.020**		0.024***								0.022***		0.026***		
						[0.009]		[0.008]								[0.008]		[0.008]		
E*FdAgXGDP80						0.026		0.041								0.015		0.027		
						[0.041]		[0.036]								[0.041]		[0.036]		
Rent80									0.000										0.000	
									[0.000]										[0.000]	
E*Rent80									0.000										-0.001	
									[0.001]										[0.001]	
MFuelP80										0.000										0.000
										[0.000]										[0.000]
E*MFuelP80										-0.001*										-0.002**
										[0.001]										[0.001]
Constant	-3.473***	-3.561***	-3.292***	-3.468***	-3.225***	-3.341***	-3.214***	-3.390***	-3.456***	-3.055***	-3.254***	-3.389***	-3.248***	-3.423***	-3.132***	-3.210***	-3.209***	-3.218***	-3.368***	-3.218***
	[0.577]	[0.562]	[0.460]	[0.492]	[0.480]	[0.453]	[0.449]	[0.439]	[0.484]	[0.483]	[0.603]	[0.586]	[0.504]	[0.478]	[0.541]	[0.518]	[0.507]	[0.444]	[0.496]	[0.601]
Observations	73	73	74	77	73	73	74	77	90	74	73	73	74	77	73	73	74	77	90	74
Adjusted R-squared	0.84	0.84	0.84	0.83	0.84	0.84	0.84	0.84	0.83	0.83	0.84	0.84	0.84	0.83	0.85	0.85	0.84	0.85	0.83	0.83

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.9 (continued). Past Institutions

	C. Legal Origin, religion and openness									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.226**	0.238***	0.246***	0.268***	0.202***	0.243***	0.215***	0.292***	0.314***	0.217**
	[0.085]	[0.085]	[0.068]	[0.081]	[0.075]	[0.090]	[0.078]	[0.078]	[0.091]	[0.083]
p60	0.754***	0.809***	0.931***	0.615**	0.964***	0.741*	1.077***	0.331	0.3	1.073***
	[0.263]	[0.286]	[0.262]	[0.243]	[0.295]	[0.407]	[0.326]	[0.268]	[0.404]	[0.396]
dens65c	0.032***	0.031***	0.025**	0.024*	0.020***	0.020***	0.023**	0.020***	0.018	0.025**
	[0.010]	[0.010]	[0.010]	[0.013]	[0.007]	[0.006]	[0.009]	[0.007]	[0.014]	[0.012]
dtt7090	-0.032	-0.02	-0.02	-0.022	-0.050**	-0.035	-0.038	-0.021	-0.021	-0.040*
	[0.021]	[0.025]	[0.025]	[0.025]	[0.024]	[0.031]	[0.029]	[0.022]	[0.021]	[0.023]
engfrac	0.272	0.374	0.372	0.054	0.194	0.245	0.295	0.09	0.028	0.246
	[0.245]	[0.272]	[0.275]	[0.257]	[0.283]	[0.305]	[0.305]	[0.269]	[0.291]	[0.271]
eurfrac	0.187	0.14	0.207	0.411**	0.324**	0.3	0.274	0.399**	0.438**	0.308*
	[0.158]	[0.170]	[0.160]	[0.191]	[0.152]	[0.180]	[0.168]	[0.176]	[0.195]	[0.164]
LOrFr	-0.287	-0.249	-0.239	-0.285*	-0.168	-0.132	-0.214	-0.196	-0.275*	-0.227
	[0.177]	[0.179]	[0.173]	[0.162]	[0.179]	[0.181]	[0.182]	[0.162]	[0.156]	[0.192]
LOrGe	0.375	0.408	0.236	0.028	0.244	0.262	0.197	0.125	-0.077	0.154
	[0.240]	[0.247]	[0.236]	[0.232]	[0.254]	[0.257]	[0.258]	[0.231]	[0.259]	[0.260]
LOrSc	0.643	0.709	0.721	0.363	0.471	0.48	0.613	0.379	0.278	0.574
	[0.518]	[0.541]	[0.602]	[0.514]	[0.551]	[0.543]	[0.592]	[0.484]	[0.564]	[0.588]
Prot	-0.01	-0.01	-0.009	-0.006	-0.008	-0.008	-0.008	-0.007	-0.006	-0.008
	[0.006]	[0.006]	[0.007]	[0.006]	[0.007]	[0.007]	[0.007]	[0.006]	[0.006]	[0.007]
Cath	-0.004*	-0.003	-0.003	-0.005**	-0.005**	-0.005**	-0.004*	-0.006***	-0.005**	-0.004*
	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Muslim	-0.001	-0.001	0.001	0.000	0.000	0.000	0.001	-0.001	0.000	0.002
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]
Years Open	0.480**	0.449**	0.380**	0.426**	0.411**	0.354*	0.380**	0.356*	0.403**	0.388**
	[0.188]	[0.183]	[0.179]	[0.169]	[0.186]	[0.198]	[0.188]	[0.179]	[0.172]	[0.181]
Latitude	1.868***	1.770***	1.482***	1.663***	2.016***	2.046***	1.699***	1.968***	1.595***	1.639***
	[0.603]	[0.609]	[0.493]	[0.421]	[0.576]	[0.603]	[0.549]	[0.415]	[0.456]	[0.494]
SubSah	0.413*	0.381*	0.389*	0.228	0.351	0.274	0.401*	0.181	0.312	0.344*
	[0.222]	[0.227]	[0.221]	[0.196]	[0.221]	[0.230]	[0.211]	[0.200]	[0.210]	[0.202]
SSEAsia	0.048	0.073	0.098	0.076	0.082	0.103	0.072	0.106	0.201	0.03
	[0.232]	[0.226]	[0.211]	[0.228]	[0.227]	[0.227]	[0.217]	[0.223]	[0.220]	[0.222]
EthnicII	-0.379	-0.372	-0.227	-0.121	-0.279	-0.198	-0.247	-0.09	-0.339	-0.153
	[0.227]	[0.251]	[0.232]	[0.258]	[0.246]	[0.295]	[0.247]	[0.287]	[0.276]	[0.271]
NCapXX80	0.004									
	[0.004]									
E*NCapXX80	-0.018**									
	[0.008]									
MFuelXX80		0.003	0.001							
		[0.004]	[0.003]							
E*MFuelXX80		-0.021**	-0.017***							
		[0.008]	[0.006]							
FdAgXX80		0.004		0.002						
		[0.005]		[0.003]						
E*FdAgXX80		-0.013		0.003						
		[0.010]		[0.007]						
NCapXGDP80					0.009**					
					[0.004]					
E*NCapXGDP80					-0.028**					
					[0.011]					
MFuelXGDP80						0.006	0.006			
						[0.006]	[0.006]			
E*MFuelXGDP80						-0.022*	-0.028**			
						[0.013]	[0.013]			
FdAgXGDP80						0.018*		0.021**		
						[0.010]		[0.009]		
E*FdAgXGDP80						-0.006		0.005		
						[0.044]		[0.041]		
Rent80									0.000	
									[0.000]	
E*Rent80									0.000	
									[0.001]	
MFuelP80										0.000
										[0.000]
E*MFuelP80										-0.001*
										[0.001]
Constant	-2.428***	-2.564***	-2.732***	-2.648***	-2.545***	-2.668***	-2.672***	-2.637***	-2.779***	-2.680***
	[0.723]	[0.701]	[0.534]	[0.591]	[0.594]	[0.627]	[0.566]	[0.584]	[0.548]	[0.645]
Observations	71	71	72	75	71	71	72	75	88	72
Adjusted R-squared	0.86	0.86	0.86	0.85	0.86	0.86	0.85	0.86	0.84	0.85

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.10. Past Conflicts

	A. Genocidal Incident						B. Revolutions and Coups					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
lrgdpWDI	0.369***	0.337***	0.415***	0.321***	0.390***	0.403***	0.348***	0.308***	0.369***	0.300***	0.378***	0.383***
	[0.073]	[0.076]	[0.078]	[0.079]	[0.091]	[0.070]	[0.062]	[0.069]	[0.079]	[0.078]	[0.072]	[0.061]
p60	0.523	0.726*	0.124	0.654	0.404	0.028	0.446	0.607*	0.077	0.556	0.238	-0.026
	[0.427]	[0.399]	[0.320]	[0.395]	[0.328]	[0.283]	[0.284]	[0.349]	[0.306]	[0.345]	[0.230]	[0.216]
dens65c	0.025*	0.022*	0.021	0.026*	0.025	0.021**	0.023*	0.021*	0.022	0.024*	0.021	0.020**
	[0.013]	[0.012]	[0.014]	[0.014]	[0.015]	[0.008]	[0.013]	[0.011]	[0.015]	[0.014]	[0.015]	[0.009]
dtt7090	-0.001	-0.02	-0.014	-0.025	0	-0.004	-0.012	-0.028	-0.007	-0.026	-0.004	0.002
	[0.032]	[0.028]	[0.019]	[0.023]	[0.028]	[0.023]	[0.024]	[0.027]	[0.019]	[0.022]	[0.021]	[0.018]
engfrac	0.515**	0.523*	0.562**	0.530**	0.512**	0.465**	0.458*	0.440*	0.386*	0.448*	0.450**	0.385*
	[0.241]	[0.261]	[0.249]	[0.254]	[0.218]	[0.215]	[0.237]	[0.255]	[0.211]	[0.236]	[0.221]	[0.213]
eurfrac	-0.03	-0.021	0.037	-0.011	-0.023	0.015	-0.018	-0.008	0.162	-0.026	0.045	0.103
	[0.180]	[0.187]	[0.179]	[0.183]	[0.181]	[0.159]	[0.176]	[0.180]	[0.184]	[0.178]	[0.176]	[0.163]
Latitude	1.882***	2.052***	1.990***	2.084***	2.108***	2.373***	1.851***	2.072***	2.211***	2.042***	1.906***	2.287***
	[0.464]	[0.490]	[0.453]	[0.468]	[0.434]	[0.381]	[0.427]	[0.469]	[0.447]	[0.439]	[0.405]	[0.369]
SubSah	0.387*	0.448**	0.361*	0.360*	0.27	0.193	0.265	0.274	0.362*	0.188	0.187	0.169
	[0.225]	[0.214]	[0.208]	[0.204]	[0.201]	[0.176]	[0.236]	[0.228]	[0.206]	[0.214]	[0.197]	[0.198]
SSEAsia	0.573***	0.549**	0.677***	0.512**	0.598***	0.565***	0.541***	0.517***	0.692***	0.477**	0.574***	0.569***
	[0.199]	[0.207]	[0.202]	[0.213]	[0.203]	[0.173]	[0.194]	[0.193]	[0.203]	[0.193]	[0.198]	[0.184]
compolt	-0.336	-0.25	-0.416***	-0.282*	-0.488***	-0.453***						
	[0.216]	[0.169]	[0.156]	[0.151]	[0.148]	[0.121]						
revcoup							-0.507*	-0.544*	-0.607**	-0.603**	-0.563*	-0.593**
							[0.299]	[0.287]	[0.263]	[0.274]	[0.285]	[0.259]
YearsOpen												
Ethnic	-0.319	-0.439	-0.391	-0.391	-0.058	-0.005	-0.353	-0.367	-0.297	-0.264	-0.139	-0.082
	[0.274]	[0.291]	[0.254]	[0.277]	[0.277]	[0.274]	[0.257]	[0.251]	[0.246]	[0.258]	[0.270]	[0.263]
MFuelXX80	-0.001						0					
	[0.003]						[0.003]					
E*MFuelXX80	-0.018**						-0.013*					
	[0.008]						[0.007]					
MFuelXGDP80		0.006						0.006				
		[0.007]						[0.005]				
E*MFuelXGDP80		-0.041**						-0.025*				
		[0.020]						[0.013]				
Rent80			-0.001						0.000			
			[0.001]						[0.000]			
E*Rent80			-0.004*						-0.001			
			[0.003]						[0.001]			
MFuelP80				0.000						0.000		
				[0.001]						[0.000]		
E*MFuelP80				-0.004*						-0.001*		
				[0.002]						[0.001]		
FdAgXX80					0.003						0.001	
					[0.003]						[0.003]	
E*FdAgXX80					0.011						0.012	
					[0.008]						[0.008]	
FdAgXGDP80						0.026***						0.024***
						[0.007]						[0.007]
E*FdAgXGDP80						0.056*						0.059*
						[0.032]						[0.030]
Constant	-3.593***	-3.573***	-3.788***	-3.421***	-3.761***	-3.613***	-3.274***	-3.157***	-3.394***	-3.036***	-3.412***	-3.342***
	[0.441]	[0.441]	[0.447]	[0.468]	[0.509]	[0.425]	[0.494]	[0.477]	[0.481]	[0.471]	[0.497]	[0.447]
Observations	71	71	87	71	74	74	71	71	88	71	74	74
Adj. R-squared	0.84	0.84	0.84	0.83	0.84	0.86	0.85	0.85	0.84	0.85	0.84	0.86

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Additional to the coefficients shown, specification D controls for religion and legal origin. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.11. Without Sub-Saharan African Countries

	A. Without latitude and regional dummy										B. With latitude and regional dummy									
	I	II	III	IV	V	VI	VII	VIII	IX	X	I	I	I	I	I	III	III	III	V	VI
lrgdpWDI	0.407***	0.399***	0.449***	0.481***	0.466***	0.485***	0.465***	0.539***	0.555***	0.481***	0.396***	0.381***	0.379***	0.405***	0.353***	0.329***	0.331***	0.416***	0.388***	0.322***
	[0.075]	[0.081]	[0.059]	[0.071]	[0.062]	[0.083]	[0.067]	[0.074]	[0.080]	[0.078]	[0.071]	[0.071]	[0.056]	[0.076]	[0.065]	[0.080]	[0.068]	[0.068]	[0.090]	[0.086]
p60	0.823**	0.959**	0.912**	0.423	0.917**	0.786	0.937**	0.063	0.356	0.884*	0.727**	0.878**	0.884***	0.486	0.909***	0.931**	1.117***	0.201	0.774*	1.135***
	[0.348]	[0.387]	[0.377]	[0.349]	[0.384]	[0.572]	[0.457]	[0.451]	[0.600]	[0.481]	[0.333]	[0.342]	[0.328]	[0.330]	[0.320]	[0.433]	[0.385]	[0.329]	[0.433]	[0.406]
dens65c	0.017**	0.016**	0.019***	0.015	0.019**	0.017**	0.019**	0.016**	0.019**	0.018**	0.024**	0.024**	0.024**	0.022	0.019**	0.020***	0.021**	0.021**	0.024*	0.025*
	[0.007]	[0.007]	[0.007]	[0.013]	[0.008]	[0.007]	[0.009]	[0.008]	[0.008]	[0.008]	[0.011]	[0.012]	[0.011]	[0.016]	[0.008]	[0.007]	[0.010]	[0.009]	[0.014]	[0.013]
dtt7090	0.005	0.006	0.005	-0.044	-0.022	-0.009	-0.015	-0.039	-0.024	-0.022	-0.002	-0.002	-0.002	-0.008	-0.029	-0.021	-0.031	-0.002	-0.014	-0.019
	[0.032]	[0.039]	[0.040]	[0.030]	[0.033]	[0.039]	[0.036]	[0.029]	[0.036]	[0.035]	[0.029]	[0.031]	[0.031]	[0.025]	[0.026]	[0.029]	[0.029]	[0.021]	[0.028]	[0.027]
eurfrac	-0.482**	-0.456**	-0.531***	-0.447**	-0.590***	-0.546**	-0.573***	-0.484**	-0.552***	-0.575***	-0.119	-0.094	-0.091	-0.039	-0.08	-0.032	-0.088	0.014	-0.029	-0.126
	[0.192]	[0.203]	[0.186]	[0.198]	[0.205]	[0.203]	[0.196]	[0.200]	[0.203]	[0.194]	[0.191]	[0.192]	[0.186]	[0.176]	[0.197]	[0.189]	[0.195]	[0.166]	[0.190]	[0.187]
engfrac	0.695**	0.712**	0.748***	0.746**	0.782***	0.791***	0.800***	0.731***	0.719***	0.740***	0.502**	0.518**	0.520**	0.533**	0.471*	0.473*	0.510*	0.475**	0.473**	0.531**
	[0.285]	[0.299]	[0.276]	[0.281]	[0.286]	[0.283]	[0.286]	[0.255]	[0.258]	[0.266]	[0.236]	[0.251]	[0.244]	[0.232]	[0.252]	[0.259]	[0.263]	[0.217]	[0.221]	[0.238]
Latitude											1.834***	1.866***	1.861***	1.940***	2.251***	2.430***	2.149***	2.327***	2.229***	2.053***
											[0.532]	[0.547]	[0.437]	[0.425]	[0.496]	[0.527]	[0.490]	[0.399]	[0.481]	[0.464]
SSEAsia											0.578**	0.559**	0.552***	0.548**	0.559***	0.454**	0.517**	0.556**	0.638***	0.448**
											[0.224]	[0.225]	[0.201]	[0.211]	[0.201]	[0.208]	[0.202]	[0.208]	[0.209]	[0.201]
Ethnic	-0.456	-0.384	-0.461	-0.233	-0.548*	-0.457	-0.487	-0.349	-0.179	-0.498*	-0.353	-0.263	-0.247	-0.073	-0.340	-0.189	-0.287	-0.061	-0.012	-0.201
	[0.273]	[0.270]	[0.287]	[0.292]	[0.296]	[0.295]	[0.294]	[0.299]	[0.323]	[0.294]	[0.255]	[0.275]	[0.246]	[0.271]	[0.253]	[0.262]	[0.248]	[0.262]	[0.255]	[0.245]
NCapXX80	-0.006										0.001									
	[0.004]										[0.004]									
E*NCapXX80	-0.022**										-0.018**									
	[0.009]										[0.008]									
MFuelXX80		-0.005	-0.002									0.002	0.002							
		[0.005]	[0.004]									[0.004]	[0.003]							
E*MFuelXX80		-0.026**	-0.020**									-0.022**	-0.022***							
		[0.010]	[0.008]									[0.010]	[0.008]							
FdAgXX80		-0.006		-0.003								0.000		0.000						
		[0.005]		[0.004]								[0.005]		[0.003]						
E*FdAgXX80		-0.006		0.026*								-0.002		0.017						
		[0.013]		[0.013]								[0.013]		[0.011]						
NCapXGDP80					0.001										0.011**					
					[0.004]										[0.004]					
E*NCapXGDP80					-0.032**										-0.029**					
					[0.014]										[0.012]					
MFuelXGDP80						-0.002	0.000									0.011	0.012*			
						[0.008]	[0.007]									[0.007]	[0.006]			
E*MFuelXGDP80						-0.028	-0.036**									-0.028*	-0.041***			
						[0.020]	[0.015]									[0.015]	[0.013]			
FdAgXGDP80						0.007		0.009								0.015*		0.019**		
						[0.010]		[0.010]								[0.008]		[0.008]		
E*FdAgXGDP80						0.043		0.06								0.066		0.068		
						[0.047]		[0.049]								[0.045]		[0.042]		
Rent80									0.000										0.000	
									[0.000]										[0.000]	
E*Rent80									-0.002*										-0.002***	
									[0.001]										[0.001]	
MFuelP80										0.000										0.001
										[0.000]										[0.000]
E*MFuelP80										-0.002***										-0.002***
										[0.001]										[0.001]
Constant	-3.213***	-3.287***	-3.636***	-3.582***	-3.766***	-3.839***	-3.792***	-3.708***	-4.061***	-3.884***	-3.911***	-3.943***	-3.934***	-3.918***	-3.877***	-3.774***	-3.835***	-3.898***	-4.117***	-3.753***
	[0.513]	[0.511]	[0.391]	[0.439]	[0.380]	[0.420]	[0.377]	[0.449]	[0.453]	[0.437]	[0.595]	[0.582]	[0.428]	[0.499]	[0.455]	[0.469]	[0.434]	[0.459]	[0.484]	[0.499]
Observations	59	59	59	61	59	59	59	61	62	59	59	59	59	61	59	59	59	61	62	59
Adj. R-squared	0.78	0.78	0.77	0.75	0.76	0.76	0.77	0.73	0.73	0.76	0.82	0.83	0.83	0.81	0.83	0.84	0.83	0.83	0.82	0.82

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Sample excludes Sub-Saharan African countries. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.12. Reweighted Least Squares

	A. Without Interaction Terms									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.401***	0.417***	0.370***	0.432***	0.349***	0.420***	0.367***	0.442***	0.433***	0.332***
	[0.081]	[0.079]	[0.075]	[0.076]	[0.077]	[0.079]	[0.084]	[0.072]	[0.083]	[0.089]
p60	0.473	0.403	0.296	0.181	0.450	0.129	0.344	-0.082	-0.091	0.453
	[0.340]	[0.330]	[0.326]	[0.295]	[0.328]	[0.338]	[0.341]	[0.295]	[0.303]	[0.356]
dens65c	0.027**	0.028**	0.024*	0.027**	0.021*	0.021*	0.025*	0.020*	0.021	0.026**
	[0.013]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.013]	[0.012]	[0.013]	[0.012]
dtt7090	-0.022	-0.002	-0.001	0.003	-0.034	0.002	-0.017	-0.001	-0.014	-0.027
	[0.024]	[0.027]	[0.027]	[0.024]	[0.026]	[0.028]	[0.030]	[0.021]	[0.021]	[0.024]
engfrac	0.486**	0.529**	0.582**	0.520**	0.431*	0.522**	0.545**	0.480**	0.516**	0.527**
	[0.240]	[0.233]	[0.235]	[0.230]	[0.239]	[0.232]	[0.249]	[0.223]	[0.238]	[0.237]
eurfrac	-0.009	-0.071	-0.071	-0.002	0.044	-0.067	-0.028	0.008	0.063	0.034
	[0.203]	[0.199]	[0.202]	[0.191]	[0.202]	[0.198]	[0.213]	[0.183]	[0.200]	[0.197]
Latitude	2.176***	2.107***	1.884***	2.127***	2.322***	2.086***	2.005***	2.282***	2.132***	2.141***
	[0.579]	[0.560]	[0.527]	[0.498]	[0.580]	[0.563]	[0.593]	[0.487]	[0.514]	[0.542]
SubSah	0.516**	0.440*	0.334	0.457**	0.490**	0.331	0.390*	0.358	0.35	0.421*
	[0.241]	[0.239]	[0.231]	[0.223]	[0.230]	[0.229]	[0.233]	[0.218]	[0.215]	[0.227]
SSEAsia	0.593**	0.565**	0.446*	0.626***	0.548**	0.496**	0.487**	0.600***	0.657***	0.490**
	[0.244]	[0.236]	[0.228]	[0.211]	[0.223]	[0.216]	[0.231]	[0.203]	[0.211]	[0.225]
Ethnic	-0.508	-0.451	-0.356	-0.322	-0.462	-0.327	-0.411	-0.224	-0.329	-0.427
	[0.328]	[0.318]	[0.318]	[0.306]	[0.314]	[0.306]	[0.326]	[0.297]	[0.283]	[0.319]
NCapXX80	0.004									
	[0.003]									
E*NCapXX80										
MFuelXX80		0.002	-0.002							
		[0.004]	[0.003]							
E*MFuelXX80										
FdAgXX80		0.006		0.004						
		[0.004]		[0.002]						
E*FdAgXX80										
NCapXGDP80					0.008					
					[0.005]					
E*NCapXGDP80										
MFuelXGDP80						-0.001	0.000			
						[0.006]	[0.006]			
E*MFuelXGDP80										
FdAgXGDP80						0.025***		0.027***		
						[0.009]		[0.008]		
E*FdAgXGDP80										
Rent80									0.000	
									[0.000]	
E*Rent80										
MFuelP80										0.000
										[0.000]
E*MFuelP80										
Constant	-4.006***	-4.050***	-3.223***	-3.976***	-3.522***	-3.785***	-3.345***	-3.957***	-3.661***	-3.231***
	[0.695]	[0.673]	[0.496]	[0.528]	[0.482]	[0.474]	[0.491]	[0.460]	[0.456]	[0.503]
Observations	73	73	74	77	73	73	74	77	90	74

Dependent variable is Rule of Law between 1996 and 2002. Estimation method is maximum likelihood. Huber weights and biweights are applied in order to downweight the effect of influential cases. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.12 (continued). Reweighted Least Squares

	B. Basic Specification									
	I	II	III	IV	V	VI	VII	VIII	IX	X
lrgdpWDI	0.399***	0.396***	0.373***	0.410***	0.345***	0.389***	0.333***	0.438***	0.429***	0.311***
	[0.080]	[0.079]	[0.072]	[0.078]	[0.076]	[0.081]	[0.081]	[0.072]	[0.084]	[0.092]
p60	0.53	0.643*	0.629*	0.338	0.750**	0.441	0.883**	-0.078	0.097	0.724*
	[0.337]	[0.340]	[0.324]	[0.315]	[0.352]	[0.393]	[0.370]	[0.292]	[0.328]	[0.401]
dens65c	0.027**	0.026**	0.025**	0.023*	0.020*	0.021*	0.023*	0.022*	0.022*	0.027**
	[0.013]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.013]	[0.013]
dtt7090	-0.016	0.000	-0.001	0.007	-0.026	0.001	-0.018	0.006	-0.007	-0.029
	[0.024]	[0.027]	[0.026]	[0.024]	[0.026]	[0.028]	[0.028]	[0.021]	[0.022]	[0.025]
engfrac	0.492**	0.542**	0.577**	0.559**	0.501**	0.569**	0.600**	0.510**	0.600**	0.552**
	[0.238]	[0.231]	[0.224]	[0.234]	[0.237]	[0.231]	[0.238]	[0.221]	[0.244]	[0.241]
eurfrac	-0.041	-0.033	-0.032	0.02	-0.021	-0.046	-0.042	0.024	0.06	-0.017
	[0.202]	[0.200]	[0.192]	[0.194]	[0.202]	[0.201]	[0.204]	[0.183]	[0.200]	[0.209]
Latitude	2.035***	1.910***	1.816***	2.040***	2.173***	2.118***	1.986***	2.349***	2.069***	2.170***
	[0.577]	[0.561]	[0.503]	[0.511]	[0.573]	[0.563]	[0.567]	[0.482]	[0.520]	[0.553]
SubSah	0.641**	0.535**	0.500**	0.37	0.564**	0.341	0.529**	0.26	0.394*	0.428*
	[0.247]	[0.245]	[0.224]	[0.235]	[0.229]	[0.237]	[0.226]	[0.222]	[0.215]	[0.231]
SSEAsia	0.607**	0.584**	0.538**	0.583***	0.547**	0.451**	0.486**	0.555***	0.656***	0.460*
	[0.242]	[0.234]	[0.220]	[0.215]	[0.220]	[0.216]	[0.221]	[0.202]	[0.210]	[0.230]
Ethnic	-0.590*	-0.463	-0.426	-0.139	-0.506	-0.214	-0.445	-0.007	-0.376	-0.361
	[0.332]	[0.335]	[0.304]	[0.322]	[0.312]	[0.322]	[0.313]	[0.309]	[0.298]	[0.327]
NCapXX80	0.002									
	[0.003]									
E*NCapXX80	-0.014									
	[0.009]									
MFuelXX80		0.002	0							
		[0.004]	[0.003]							
E*MFuelXX80		-0.019**	-0.022***							
		[0.009]	[0.007]							
FdAgXX80		0.003		0.003						
		[0.004]		[0.003]						
E*FdAgXX80		0.001		0.016*						
		[0.011]		[0.009]						
NCapXGDP80					0.008					
					[0.005]					
E*NCapXGDP80					-0.032*					
					[0.017]					
MFuelXGDP80						0.003	0.005			
						[0.006]	[0.006]			
E*MFuelXGDP80						-0.02	-0.042**			
						[0.018]	[0.017]			
FdAgXGDP80						0.022**		0.029***		
						[0.009]		[0.008]		
E*FdAgXGDP80						0.053		0.068*		
						[0.043]		[0.039]		
Rent80									-0.001	
									[0.001]	
E*Rent80									-0.004	
									[0.003]	
MFuelP80										0.000
										[0.000]
E*MFuelP80										-0.002
										[0.001]
Constant	-3.905***	-3.927***	-3.709***	-3.911***	-3.707***	-3.767***	-3.653***	-3.850***	-3.946***	-3.445***
	[0.552]	[0.526]	[0.440]	[0.471]	[0.450]	[0.441]	[0.448]	[0.422]	[0.452]	[0.493]
Observations	73	73	74	77	73	73	74	77	89	74

Dependent variable is Rule of Law between 1996 and 2002. Estimation method is maximum likelihood. Huber weights and biweights are applied in order to downweight the effect of influential cases. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.12 (continued). Reweighted Least Squares

	C. Past Institutions and Openness									
	I	I	I	I	I	III	III	III	V	VI
lrgdpWDI	0.191**	0.224**	0.201***	0.226***	0.162*	0.227**	0.183**	0.266***	0.285***	0.184*
	[0.083]	[0.084]	[0.074]	[0.081]	[0.086]	[0.091]	[0.086]	[0.081]	[0.096]	[0.095]
p60	0.793**	0.873**	0.974***	0.624*	1.058**	0.737	1.157***	0.256	0.389	1.056**
	[0.363]	[0.377]	[0.351]	[0.334]	[0.421]	[0.457]	[0.416]	[0.339]	[0.388]	[0.466]
dens65c	0.029**	0.031**	0.027**	0.023**	0.022*	0.023*	0.024**	0.022*	0.017	0.024*
	[0.012]	[0.012]	[0.011]	[0.011]	[0.012]	[0.012]	[0.012]	[0.011]	[0.013]	[0.012]
dtt7090	-0.026	-0.014	-0.009	-0.012	-0.042	-0.016	-0.027	-0.007	-0.022	-0.037
	[0.024]	[0.028]	[0.025]	[0.024]	[0.028]	[0.030]	[0.029]	[0.023]	[0.023]	[0.025]
engfrac	0.248	0.376	0.424	0.144	0.26	0.421	0.355	0.223	0.108	0.234
	[0.355]	[0.364]	[0.334]	[0.318]	[0.370]	[0.372]	[0.371]	[0.324]	[0.341]	[0.361]
eurfrac	0.178	0.155	0.213	0.388*	0.282	0.198	0.25	0.337	0.404	0.309
	[0.253]	[0.258]	[0.237]	[0.225]	[0.270]	[0.263]	[0.263]	[0.223]	[0.243]	[0.255]
Latitude	1.686***	1.816***	1.371***	1.702***	1.656**	1.639**	1.404**	1.985***	1.610***	1.437**
	[0.563]	[0.567]	[0.488]	[0.475]	[0.625]	[0.615]	[0.584]	[0.491]	[0.550]	[0.558]
SubSah	0.401*	0.440*	0.390*	0.219	0.251	0.152	0.348	0.112	0.313	0.273
	[0.237]	[0.241]	[0.217]	[0.224]	[0.246]	[0.249]	[0.234]	[0.223]	[0.231]	[0.234]
SSEAsia	-0.057	0.028	-0.025	0.01	-0.059	-0.026	-0.046	0.045	0.187	-0.06
	[0.247]	[0.248]	[0.229]	[0.236]	[0.258]	[0.252]	[0.248]	[0.235]	[0.247]	[0.250]
sopen7	0.552***	0.459**	0.460***	0.480***	0.533***	0.433**	0.470***	0.397**	0.442**	0.494***
	[0.170]	[0.172]	[0.157]	[0.171]	[0.179]	[0.187]	[0.173]	[0.179]	[0.186]	[0.176]
LOrFr	-0.310*	-0.342**	-0.321*	-0.383**	-0.188	-0.15	-0.263	-0.248	-0.297*	-0.272
	[0.167]	[0.170]	[0.160]	[0.158]	[0.182]	[0.182]	[0.176]	[0.165]	[0.162]	[0.185]
LOrGe	0.309	0.383	0.249	0.029	0.218	0.277	0.181	0.167	-0.039	0.096
	[0.315]	[0.316]	[0.279]	[0.281]	[0.312]	[0.305]	[0.305]	[0.279]	[0.315]	[0.316]
LOrSc	0.5	0.797	0.618	0.251	0.073	0.128	0.283	0.185	0.263	0.187
	[0.637]	[0.638]	[0.561]	[0.566]	[0.622]	[0.615]	[0.612]	[0.566]	[0.602]	[0.618]
Prot	-0.008	-0.011*	-0.007	-0.005	-0.002	-0.002	-0.003	-0.004	-0.005	-0.003
	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Cath	-0.004	-0.003	-0.003	-0.005*	-0.005*	-0.005	-0.004	-0.006**	-0.005	-0.004
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Muslim	-0.001	0.000	0.001	0.001	0.001	0.000	0.002	-0.001	0.001	0.002
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Ethnic	-0.373	-0.273	-0.200	-0.095	-0.346	-0.200	-0.285	-0.017	-0.316	-0.258
	[0.308]	[0.320]	[0.286]	[0.301]	[0.317]	[0.329]	[0.311]	[0.309]	[0.294]	[0.322]
NCapXX80	0.002									
	[0.003]									
E*NCapXX80	-0.021**									
	[0.009]									
MFuelXX80		0.002	0.000							
		[0.004]	[0.002]							
E*MFuelXX80		-0.022**	-0.018**							
		[0.010]	[0.007]							
FdAgXX80		0.004		0.003						
		[0.004]		[0.002]						
E*FdAgXX80		-0.01		0.006						
		[0.011]		[0.009]						
NCapXGDP80					0.007					
					[0.005]					
E*NCapXGDP80					-0.029*					
					[0.017]					
MFuelXGDP80						0.002	0.004			
						[0.006]	[0.006]			
E*MFuelXGDP80						-0.021	-0.029			
						[0.018]	[0.017]			
FdAgXGDP80						0.017*		0.022**		
						[0.009]		[0.009]		
E*FdAgXGDP80						-0.004		0.01		
						[0.045]		[0.041]		
Rent80									0.000	
									[0.000]	
E*Rent80									0.000	
									[0.001]	
MFuelP80										0.000
										[0.000]
E*MFuelP80										-0.001
										[0.001]
Constant	-2.096***	-2.492***	-2.391***	-2.348***	-2.238***	-2.475***	-2.446***	-2.399***	-2.674***	-2.390***
	[0.650]	[0.658]	[0.544]	[0.598]	[0.628]	[0.623]	[0.605]	[0.574]	[0.604]	[0.656]
Observations	71	71	72	75	71	71	72	75	88	72

Dependent variable is Rule of Law between 1996 and 2002. Estimation method is maximum likelihood. Huber weights and biweights are applied in order to downweight the effect of influential cases. Ethnic fractionalization and natural resource variables are centered. E* indicates that variable is interacted with ethnic fractionalization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.13. Polarization

	A. Basic Specification						B. Past Institutions						C. All Control Variables					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI
lrgdpWDI	0.381***	0.406***	0.360***	0.413***	0.397***	0.311***	0.333***	0.363***	0.301***	0.370***	0.343***	0.251***	0.212**	0.218*	0.182*	0.216**	0.233**	0.178*
	[0.060]	[0.072]	[0.073]	[0.059]	[0.080]	[0.080]	[0.063]	[0.072]	[0.072]	[0.061]	[0.091]	[0.084]	[0.091]	[0.111]	[0.095]	[0.091]	[0.089]	[0.095]
p60	0.377	0.347	0.499	0.017	0.283	0.709**	0.659*	0.560*	0.897**	0.203	0.482	1.122***	0.735	0.719*	0.908*	0.552	0.521	0.923*
	[0.291]	[0.263]	[0.347]	[0.257]	[0.324]	[0.349]	[0.330]	[0.284]	[0.391]	[0.291]	[0.400]	[0.401]	[0.522]	[0.398]	[0.512]	[0.369]	[0.381]	[0.523]
dens65c	0.028**	0.025	0.028*	0.020**	0.026*	0.030**	0.029**	0.026*	0.028**	0.020***	0.026*	0.031**	0.025**	0.024**	0.022**	0.020***	0.023**	0.024**
	[0.014]	[0.016]	[0.015]	[0.008]	[0.015]	[0.015]	[0.012]	[0.015]	[0.012]	[0.007]	[0.015]	[0.013]	[0.010]	[0.012]	[0.010]	[0.007]	[0.011]	[0.011]
dtt7090	-0.01	-0.007	-0.029	-0.007	-0.026	-0.034	-0.015	-0.005	-0.039	-0.003	-0.027	-0.038	-0.027	-0.019	-0.049	-0.021	-0.023	-0.037
	[0.028]	[0.022]	[0.029]	[0.018]	[0.017]	[0.022]	[0.028]	[0.025]	[0.031]	[0.021]	[0.021]	[0.024]	[0.030]	[0.032]	[0.032]	[0.025]	[0.023]	[0.026]
eurfrac	-0.02	0.002	-0.036	0.039	0.019	-0.023	0.214	0.301	0.258	0.318	0.268	0.229	0.261	0.263	0.292	0.330*	0.285	0.248
	[0.182]	[0.172]	[0.194]	[0.157]	[0.185]	[0.186]	[0.205]	[0.222]	[0.212]	[0.202]	[0.216]	[0.201]	[0.184]	[0.222]	[0.191]	[0.192]	[0.197]	[0.189]
engfrac	0.505**	0.522**	0.519**	0.470**	0.474**	0.498**	0.423	0.216	0.407	0.231	0.292	0.447	0.359	0.207	0.288	0.252	0.307	0.272
	[0.238]	[0.218]	[0.254]	[0.209]	[0.215]	[0.234]	[0.318]	[0.296]	[0.343]	[0.272]	[0.308]	[0.316]	[0.308]	[0.254]	[0.351]	[0.249]	[0.333]	[0.345]
Latitude	2.057***	2.161***	2.209***	2.387***	2.302***	2.348***	2.028***	2.059***	2.168***	2.310***	2.134***	2.254***	1.781***	1.852***	1.879***	2.231***	1.796***	1.816***
	[0.470]	[0.419]	[0.528]	[0.368]	[0.484]	[0.483]	[0.492]	[0.432]	[0.556]	[0.379]	[0.516]	[0.515]	[0.524]	[0.456]	[0.548]	[0.461]	[0.467]	[0.492]
SubSah	0.268	0.336	0.294	0.236	0.352*	0.333	0.325	0.286	0.350*	0.181	0.295	0.388**	0.241	0.137	0.216	0.16	0.232	0.205
	[0.205]	[0.203]	[0.211]	[0.198]	[0.206]	[0.206]	[0.211]	[0.199]	[0.207]	[0.198]	[0.207]	[0.191]	[0.246]	[0.233]	[0.239]	[0.229]	[0.215]	[0.237]
SSEAsia	0.536**	0.599***	0.525**	0.553***	0.643***	0.490**	0.360*	0.377**	0.330*	0.367**	0.435**	0.311*	0.196	0.169	0.14	0.219	0.233	0.119
	[0.221]	[0.208]	[0.224]	[0.206]	[0.212]	[0.219]	[0.195]	[0.181]	[0.196]	[0.162]	[0.183]	[0.185]	[0.209]	[0.211]	[0.217]	[0.196]	[0.195]	[0.218]
YrsOpen													0.384**	0.437**	0.417**	0.347**	0.374**	0.398**
													[0.174]	[0.164]	[0.186]	[0.164]	[0.172]	[0.196]
LOrFr							-0.153	-0.157	-0.131	-0.053	-0.066	-0.061	-0.289	-0.243	-0.276*	-0.123	-0.221	-0.255
							[0.172]	[0.167]	[0.175]	[0.144]	[0.155]	[0.183]	[0.173]	[0.158]	[0.163]	[0.138]	[0.141]	[0.164]
LOrGe							0.432*	0.251	0.435	0.359	0.361	0.514*	0.371	0.272	0.322	0.365	0.271	0.303
							[0.252]	[0.279]	[0.285]	[0.258]	[0.267]	[0.299]	[0.232]	[0.231]	[0.256]	[0.234]	[0.228]	[0.257]
LOrSc							0.708	0.282	0.693	0.272	0.325	0.592	0.968*	0.545	0.826	0.601	0.584	0.600
							[0.562]	[0.465]	[0.562]	[0.382]	[0.474]	[0.492]	[0.539]	[0.483]	[0.546]	[0.463]	[0.474]	[0.510]
Prot							-0.01	-0.005	-0.009	-0.006	-0.004	-0.008	-0.012*	-0.007	-0.011	-0.008	-0.008	-0.009
							[0.006]	[0.005]	[0.006]	[0.005]	[0.005]	[0.006]	[0.007]	[0.006]	[0.007]	[0.006]	[0.006]	[0.006]
Cath							-0.004*	-0.005**	-0.005**	-0.006***	-0.005**	-0.005**	-0.002	-0.003	-0.003	-0.004*	-0.003	-0.003
							[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Muslim							-0.001	-0.001	-0.001	-0.002	-0.001	0.000	0.001	0.002	0.002	0.000	0.000	0.002
							[0.003]	[0.003]	[0.003]	[0.002]	[0.003]	[0.003]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.003]
compolt													-0.385*	-0.445**	-0.304	-0.368***	-0.239	-0.298
													[0.218]	[0.168]	[0.200]	[0.110]	[0.167]	[0.198]
revcoup													-0.452**	-0.501**	-0.494**	-0.481**	-0.534***	-0.505**
													[0.217]	[0.209]	[0.209]	[0.190]	[0.197]	[0.207]
Polarization	-0.155	0.104	-0.134	-0.016	-0.020	-0.086	-0.088	0.060	-0.083	-0.048	-0.002	-0.014	0.041	0.158	0.007	0.138	-0.061	-0.004
	[0.233]	[0.259]	[0.235]	[0.229]	[0.225]	[0.235]	[0.225]	[0.251]	[0.230]	[0.241]	[0.228]	[0.230]	[0.213]	[0.228]	[0.223]	[0.225]	[0.207]	[0.213]
MFuelXX80	-0.001						0.001						0.001					
	[0.003]						[0.003]						[0.003]					
P*MFuelXX80	-0.016**						-0.019***						-0.017**					
	[0.007]						[0.007]						[0.008]					
FdAgXX80		0.002						0.002						0.003				
		[0.003]						[0.003]						[0.003]				
P*FdAgXX80		0.016*						0.009						0.003				
		[0.009]						[0.008]						[0.007]				
MFuelXGDP80			0.003						0.006						0.007			
			[0.007]						[0.006]						[0.007]			
P*MFuelXGDP80			-0.022						-0.035**						-0.031			
			[0.015]						[0.016]						[0.018]			
FdAgXGDP80				0.021***						0.025***						0.021**		
				[0.007]						[0.008]						[0.008]		
P*FdAgXGDP80				0.061*						0.026						0.027		
				[0.031]						[0.035]						[0.035]		
Rent80					0.000						0.000						0.000	
					[0.000]						[0.000]						[0.001]	
P*Rent80					-0.002***						-0.002**						-0.005**	
					[0.001]						[0.001]						[0.002]	
MFuelP80						0.000*						0.001*						0.001
						[0.000]						[0.000]						[0.001]
P*MFuelP80						-0.002***						-0.003***						-0.003
						[0.001]						[0.001]						[0.002]
Constant	-3.625***	-3.902***	-3.617***	-3.734***	-3.831***	-3.459***	-3.188***	-3.377***	-3.173***	-3.181***	-3.256***	-3.076***	-2.304***	-2.393***	-2.229***	-2.351***	-2.363***	-2.199***
	[0.413]	[0.465]	[0.418]	[0.418]	[0.437]	[0.461]	[0.484]	[0.485]	[0.492]	[0.440]	[0.493]	[0.569]	[0.547]	[0.636]	[0.564]	[0.561]	[0.547]	[0.584]
Observations	73	75	73	75	87	73	73	75	73	75	87	73	67	69	67	69	82	67
Adjusted R-squa	0.83	0.83	0.82	0.85	0.83	0.82	0.84	0.84	0.84	0.86	0.84	0.84	0.88	0.88	0.87	0.89	0.86	0.87

Dependent variable is Rule of Law between 1996 and 2002. Robust standard errors in brackets. Polarization and natural resource variables are centered. P* indicates that variable is interacted with polarization. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.14. Marginal Effect of Natural Resources on Rule of Law (Polarization)

Percentile	Value	MFuelXX80		MFuelXGDP80		Rent80		MFuelP80		FdAgXX80		FdAgXGDP80	
	Polarization	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err
5	0.10	0.006	0.005	0.013	0.012	0.001**	0.000	0.001***	0.000	-0.006	0.005	-0.006	0.017
10	0.16	0.006	0.005	0.011	0.011	0.001*	0.000	0.001***	0.000	-0.005	0.005	-0.003	0.015
15	0.21	0.005	0.005	0.010	0.01	0.001*	0.000	0.001***	0.000	-0.004	0.005	0.001	0.014
20	0.24	0.004	0.004	0.009	0.01	0.001*	0.000	0.001***	0.000	-0.003	0.004	0.003	0.012
25	0.36	0.002	0.004	0.007	0.009	0.000	0.000	0.001**	0.000	-0.002	0.004	0.009	0.010
30	0.39	0.002	0.004	0.006	0.008	0.000	0.000	0.001**	0.000	-0.001	0.003	0.011	0.009
35	0.45	0.001	0.003	0.005	0.008	0.000	0.000	0.001**	0.000	0.000	0.003	0.015*	0.008
40	0.58	-0.001	0.003	0.002	0.006	0.000	0.000	0.000	0.000	0.002	0.003	0.021**	0.007
45	0.63	-0.002	0.003	0.001	0.006	0.000	0.000	0.000	0.000	0.003	0.002	0.026***	0.007
50	0.64	-0.002	0.003	0.001	0.006	0.000	0.000	0.000	0.000	0.003	0.002	0.027***	0.007
55	0.68	-0.003	0.003	0.000	0.006	0.000	0.000	0.000	0.000	0.004	0.002	0.029***	0.007
60	0.69	-0.003	0.003	-0.001	0.006	0.000	0.000	0.000	0.000	0.004	0.002	0.030***	0.008
65	0.72	-0.004	0.003	-0.001	0.006	0.000	0.000	0.000	0.000	0.004*	0.002	0.031***	0.008
70	0.74	-0.004	0.003	-0.002	0.006	0.000	0.000	0.000	0.000	0.005*	0.003	0.032***	0.008
75	0.75	-0.004	0.002	-0.002	0.006	0.000	0.000	0.000	0.000	0.005*	0.003	0.033***	0.009
80	0.77	-0.004*	0.002	-0.002	0.006	0.000	0.000	0.000	0.000	0.005*	0.003	0.034***	0.009
85	0.81	-0.005*	0.003	-0.003	0.006	0.000	0.000	0.000	0.000	0.006**	0.003	0.036***	0.009
90	0.82	-0.005**	0.003	-0.003	0.006	0.000	0.000	0.000	0.000	0.006**	0.003	0.037***	0.010
95	0.88	-0.006**	0.003	-0.005	0.006	0.000	0.000	0.000	0.000	0.007**	0.003	0.041***	0.011
DoF		60		61		74		60		62		62	

Marg. Effect is estimated marginal effect of variable on Rule of Law. Estimates are obtained from specification A of Table 13. DoF is Degrees of Freedom.
Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Table III.15. Marginal Effect of Polarization on Rule of Law (Natural Resources)

Percentile	MFuelXX80			MFuelXGDP80			Rent80			MFuelP80			FdAgXX80			FdAgXGDP80		
	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.
5	0.22	0.319	0.281	0.01	0.085	0.263	0.00	0.057	0.24	0.00	0.033	0.255	0.78	-0.518*	0.29	0.28	-0.444	0.269
10	1.61	0.296	0.276	0.24	0.08	0.261	0.06	0.057	0.24	0.24	0.033	0.255	3.51	-0.474*	0.275	1.34	-0.38	0.252
15	3.07	0.273	0.270	0.36	0.077	0.26	0.22	0.057	0.24	0.43	0.033	0.255	8.18	-0.397	0.252	1.57	-0.366	0.248
20	5.16	0.239	0.263	0.59	0.072	0.259	0.39	0.057	0.24	0.66	0.032	0.255	11.25	-0.347	0.24	1.89	-0.347	0.244
25	5.36	0.236	0.262	0.83	0.066	0.257	0.89	0.056	0.24	1.61	0.03	0.255	12.03	-0.334	0.237	2.64	-0.301	0.235
30	6.01	0.226	0.260	1.10	0.06	0.256	1.17	0.055	0.24	1.90	0.03	0.255	15.69	-0.275	0.227	2.85	-0.288	0.233
35	7.50	0.201	0.256	1.26	0.057	0.255	1.45	0.055	0.24	2.69	0.028	0.255	19.95	-0.205	0.22	3.14	-0.271	0.23
40	8.46	0.186	0.253	1.34	0.055	0.254	2.28	0.054	0.239	4.40	0.025	0.254	22.73	-0.16	0.218	3.76	-0.233	0.225
45	9.02	0.177	0.251	2.12	0.038	0.25	2.75	0.053	0.239	5.15	0.024	0.254	23.38	-0.149	0.218	4.12	-0.211	0.223
50	13.67	0.102	0.240	2.75	0.024	0.246	4.21	0.051	0.239	8.23	0.018	0.253	31.08	-0.024	0.23	4.86	-0.166	0.22
55	18.14	0.030	0.233	3.75	0.001	0.242	7.41	0.046	0.238	9.63	0.015	0.252	38.45	0.097	0.257	5.97	-0.099	0.221
60	23.94	-0.063	0.229	4.82	-0.023	0.238	9.33	0.043	0.237	10.54	0.014	0.252	44.58	0.197	0.289	6.35	-0.076	0.223
65	28.14	-0.131	0.231	6.68	-0.064	0.234	14.16	0.036	0.236	14.30	0.007	0.251	50.22	0.289	0.323	7.04	-0.034	0.227
70	35.88	-0.255	0.244	8.39	-0.102	0.233	16.83	0.032	0.235	19.32	-0.003	0.249	61.08	0.466	0.397	8.35	0.045	0.24
75	56.11	-0.581*	0.319	11.16	-0.163	0.238	24.87	0.02	0.232	19.71	-0.003	0.249	65.11	0.532	0.427	9.66	0.125	0.259
80	65.38	-0.73*	0.366	14.11	-0.229	0.25	33.14	0.007	0.23	33.23	-0.029	0.245	70.51	0.62	0.468	12.39	0.29	0.313
85	75.78	-0.897**	0.424	19.72	-0.354	0.291	41.82	-0.006	0.227	73.49	-0.104	0.233	74.29	0.682	0.497	13.48	0.357	0.338
90	85.83	-1.059**	0.484	29.04	-0.562	0.391	88.29	-0.076	0.215	124.69	-0.200	0.221	82.73	0.819	0.564	17.40	0.594	0.437
95	97.90	-1.253**	0.558	50.78	-1.046	0.681	239.42	-0.305	0.197	312.66	-0.552***	0.211	89.01	0.922	0.615	23.93	0.99	0.622
DoF	60			60			74			60			62			62		

Marg. Effect is estimated marginal effect of ethnic fractionalization on Rule of Law. Estimates are obtained from specification A of Table 13. DoF is Degrees of Freedom. Rent80 and MFuelP80 are expressed in USD thousands. Percentiles for Rent80 and MFuelP80 are calculated on positive observations. Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent.

Table III.16. Aid

	A. Without Interaction Terms						B. Basic Specification (with interaction term)						C. Conflicts and Revolutions					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI	I	II	III	IV	V	VI
lrgdpWDI	0.232**	0.371***	0.287**	0.255**	0.298**	0.240**	0.243**	0.386***	0.318**	0.356***	0.275**	0.214**	0.231**	0.301***	0.296***	0.327***	0.245**	0.195**
	[0.096]	[0.079]	[0.125]	[0.110]	[0.130]	[0.107]	[0.103]	[0.081]	[0.129]	[0.117]	[0.119]	[0.095]	[0.087]	[0.085]	[0.106]	[0.101]	[0.102]	[0.083]
p60	0.538	0.237	0.39	0.49	0.415	0.454	0.573	0.248	0.494	0.559*	0.339	0.351	0.358	0.415	0.273	0.401	0.135	0.19
	[0.350]	[0.298]	[0.358]	[0.354]	[0.355]	[0.340]	[0.352]	[0.303]	[0.329]	[0.298]	[0.315]	[0.272]	[0.349]	[0.329]	[0.318]	[0.282]	[0.287]	[0.255]
dens65c	0.009	0.029*	-0.005	-0.001	0.013	0.045	0.018	0.030*	-0.024	0.028	0.066	0.175*	-0.094	0.031**	-0.147	-0.075	-0.069	0.041
	[0.112]	[0.015]	[0.114]	[0.117]	[0.109]	[0.110]	[0.113]	[0.016]	[0.119]	[0.111]	[0.107]	[0.095]	[0.100]	[0.015]	[0.099]	[0.094]	[0.090]	[0.080]
dtt7090	-0.027	-0.019	-0.027	-0.025	-0.028	-0.038*	-0.027	-0.018	-0.02	-0.032*	-0.022	-0.048***	-0.028	-0.03	-0.023	-0.032*	-0.026	-0.048***
	[0.018]	[0.018]	[0.020]	[0.018]	[0.021]	[0.019]	[0.018]	[0.019]	[0.022]	[0.018]	[0.019]	[0.015]	[0.018]	[0.019]	[0.020]	[0.017]	[0.017]	[0.015]
eurfrac	0.127	-0.059	0.249	0.125	0.212	0.021	0.114	-0.025	0.157	-0.003	-0.135	-0.414*	-0.021	-0.063	0.037	-0.107	-0.233	-0.508**
	[0.299]	[0.271]	[0.305]	[0.294]	[0.309]	[0.272]	[0.303]	[0.279]	[0.294]	[0.241]	[0.327]	[0.232]	[0.289]	[0.282]	[0.285]	[0.232]	[0.309]	[0.213]
engfrac	0.275	0.273	0.269	0.296	0.279	-0.043	0.24	0.236	0.307	0.042	0.513	-0.118	0.316	0.086	0.371	0.13	0.584	0.05
	[0.408]	[0.344]	[0.394]	[0.406]	[0.406]	[0.318]	[0.417]	[0.351]	[0.393]	[0.472]	[0.487]	[0.317]	[0.440]	[0.379]	[0.414]	[0.484]	[0.497]	[0.337]
Latitude	2.246***	1.707**	2.254**	2.274***	2.200**	1.935**	2.396***	1.832**	2.270***	2.027***	1.207	0.431	2.084**	1.951**	1.829**	1.733**	0.859	0.18
	[0.783]	[0.743]	[0.868]	[0.820]	[0.887]	[0.770]	[0.883]	[0.800]	[0.830]	[0.677]	[0.850]	[0.578]	[0.853]	[0.864]	[0.777]	[0.657]	[0.780]	[0.496]
SubSah	0.439	0.364	0.606*	0.491	0.579*	0.437*	0.432	0.378	0.494	0.412*	0.249	0.14	0.177	0.156	0.196	0.163	-0.029	-0.104
	[0.301]	[0.272]	[0.304]	[0.295]	[0.297]	[0.258]	[0.296]	[0.271]	[0.301]	[0.212]	[0.296]	[0.204]	[0.296]	[0.287]	[0.312]	[0.223]	[0.306]	[0.198]
SSEAsia	0.571**	0.510**	0.712**	0.588**	0.730**	0.611**	0.580**	0.533**	0.604**	0.546**	0.489*	0.400*	0.629**	0.490**	0.619**	0.548***	0.512*	0.419**
	[0.250]	[0.237]	[0.291]	[0.272]	[0.292]	[0.249]	[0.253]	[0.244]	[0.278]	[0.209]	[0.279]	[0.208]	[0.246]	[0.220]	[0.263]	[0.186]	[0.265]	[0.180]
revcoup													-0.424*	-0.492**	-0.474*	-0.383**	-0.383*	-0.267
													[0.230]	[0.228]	[0.241]	[0.189]	[0.215]	[0.189]
compolt													-0.395**	-0.298*	-0.328**	-0.238*	-0.380**	-0.333**
													[0.169]	[0.164]	[0.151]	[0.139]	[0.145]	[0.131]
YrsOpen																		
LOrFr																		
LOrGe																		
LOrSc																		
Prot																		
Cath																		
Muslim																		
Log Population																		
Ethnic	-0.135	-0.226	-0.169	-0.196	-0.162	-0.190	-0.101	-0.231	-0.276	-0.451	0.067	-0.397	-0.188	0.042	-0.332	-0.441	-0.026	-0.438
	[0.385]	[0.320]	[0.393]	[0.380]	[0.396]	[0.350]	[0.389]	[0.332]	[0.399]	[0.352]	[0.347]	[0.278]	[0.383]	[0.375]	[0.379]	[0.347]	[0.352]	[0.282]
ODAadj	0.006						0.059						0.055					
	[0.029]						[0.131]						[0.132]					
E*ODAadj							-0.074						-0.072					
							[0.184]						[0.182]					
ODAgdp		0.124						2.500						3.583				
		[0.805]						[3.964]						[4.007]				
E*ODAgdp								-3.136						-4.641				
								[5.204]						[5.157]				
NTRgdp			-0.276						7.311						7.022			
			[0.276]						[4.961]						[5.065]			
E*NTRgdp									-9.459						-9.099			
									[6.089]						[6.195]			
NFLgdp				-0.031						12.766***						11.340***		
				[0.435]						[3.355]						[3.360]		
E*NFLgdp										-16.189***						-14.396***		
										[4.069]						[4.079]		
NTRpercap					0.000						0.011**						0.010**	
					[0.000]						[0.005]						[0.004]	
E*NTRpercap											-0.015**						-0.013**	
											[0.006]						[0.006]	
NFLpercap						0.002*						0.013***						0.012***
						[0.001]						[0.002]						[0.002]
E*NFLpercap												-0.017***						-0.016***
												[0.002]						[0.002]
Constant	-2.943***	-3.487***	-3.349***	-3.089***	-3.415***	-2.884***	-3.050***	-3.621***	-3.440***	-3.573***	-2.839***	-2.211***	-2.463***	-2.943***	-2.739***	-2.963***	-2.135***	-1.669***
	[0.579]	[0.581]	[0.785]	[0.707]	[0.806]	[0.687]	[0.661]	[0.606]	[0.790]	[0.700]	[0.773]	[0.617]	[0.572]	[0.627]	[0.705]	[0.659]	[0.727]	[0.546]
Observations	64	68	59	62	60	63	64	68	59	62	60	63	62	64	57	60	58	61
Adj. R-squared	0.38	0.57	0.35	0.33	0.35	0.4	0.37	0.57	0.37	0.48	0.44	0.61	0.44	0.6	0.44	0.52	0.5	0.66

Dependent variable is average Rule of Law between 1996 and 2002. E* indicates that variable is interacted with ethnic fractionalization. Ethnic fractionalization and aid variables are centered around their mean. Robust standard errors are in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level. Instruments are predicted trade share, log of population, French Colony dummy, Central America dummy, Egypt dummy, arms imports relative to total imports and the interaction terms of these variables with ethnic fractionalization.

Table III.16 (continued). Aid

	D. All Control Variables						E. IV Regression					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
lrgdpWDI	0.207*	0.226**	0.283**	0.307***	0.221*	0.179*	0.325**	0.425***	0.351***	0.371***	0.360**	0.222**
	[0.114]	[0.099]	[0.132]	[0.111]	[0.123]	[0.099]	[0.138]	[0.098]	[0.126]	[0.117]	[0.177]	[0.099]
p60	0.527	0.609	0.431	0.508	0.161	0.274	0.915**	0.791**	0.635*	0.580*	0.596	0.475
	[0.461]	[0.426]	[0.424]	[0.345]	[0.449]	[0.356]	[0.381]	[0.316]	[0.355]	[0.296]	[0.447]	[0.319]
dens65c	-0.084	0.029***	-0.143	-0.079	-0.078	0.03	0.062	0.052***	0	0.042	-0.023	0.094
	[0.118]	[0.008]	[0.122]	[0.114]	[0.120]	[0.105]	[0.122]	[0.013]	[0.106]	[0.114]	[0.129]	[0.143]
dtt7090	-0.029	-0.037	-0.036	-0.042*	-0.031	-0.050**	-0.019	-0.014	-0.001	-0.026	0.003	-0.035
	[0.024]	[0.023]	[0.029]	[0.022]	[0.026]	[0.019]	[0.020]	[0.023]	[0.028]	[0.022]	[0.039]	[0.028]
eurfrac	0.336	0.421	0.328	0.169	-0.067	-0.295	-0.004	0.107	0.12	0.011	0.147	-0.177
	[0.339]	[0.354]	[0.321]	[0.280]	[0.351]	[0.297]	[0.333]	[0.271]	[0.383]	[0.247]	[0.524]	[0.452]
engfrac	-0.341	-0.661	-0.397	-0.322	0.295	0.062	0.038	0.04	0.336	0.033	0.342	-0.028
	[0.737]	[0.770]	[0.762]	[0.695]	[0.723]	[0.584]	[0.503]	[0.443]	[0.451]	[0.485]	[0.524]	[0.430]
Latitude	1.355	1.694	1.296	1.499	0.499	0.331	3.070***	2.312**	1.875*	2.064***	2.028	1.264
	[1.154]	[1.112]	[1.290]	[1.018]	[1.100]	[0.755]	[0.905]	[0.966]	[0.954]	[0.703]	[1.445]	[1.216]
SubSah	0.083	0.184	0.088	0.168	-0.048	-0.011	0.325	0.403	0.521	0.447**	0.729	0.322
	[0.368]	[0.351]	[0.431]	[0.315]	[0.373]	[0.249]	[0.317]	[0.247]	[0.408]	[0.214]	[0.597]	[0.411]
SSEAsia	0.216	0.177	0.296	0.263	0.169	0.182	0.653**	0.617**	0.722*	0.676***	0.798	0.511
	[0.215]	[0.238]	[0.272]	[0.227]	[0.229]	[0.192]	[0.252]	[0.232]	[0.387]	[0.230]	[0.477]	[0.346]
revcoup	-0.36	-0.424	-0.34	-0.368	-0.33	-0.331						
	[0.311]	[0.273]	[0.389]	[0.280]	[0.354]	[0.248]						
compolt	-0.228	-0.129	-0.182	-0.155	-0.316*	-0.307*						
	[0.179]	[0.177]	[0.183]	[0.180]	[0.181]	[0.159]						
YrsOpen	0.436	0.607**	0.453	0.439	0.35	0.344						
	[0.340]	[0.298]	[0.394]	[0.311]	[0.329]	[0.216]						
LOrFr	-0.164	-0.117	-0.202	-0.2	-0.242	-0.152						
	[0.159]	[0.156]	[0.167]	[0.154]	[0.167]	[0.154]						
LOrGe	-0.158	-0.232	0.000	0.000	0.000	0.000						
	[0.500]	[0.426]	[0.000]	[0.000]	[0.000]	[0.000]						
LOrSc	0.000	0.000	0.000	0.000	0.000	0.000						
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]						
Prot	-0.009	-0.008	-0.005	-0.009	-0.010	-0.010						
	[0.011]	[0.011]	[0.012]	[0.011]	[0.011]	[0.009]						
Cath	-0.008*	-0.007*	-0.006	-0.004	-0.004	-0.002						
	[0.004]	[0.004]	[0.005]	[0.004]	[0.004]	[0.003]						
Muslim	-0.002	0.000	0.001	0.001	0.000	0.000						
	[0.003]	[0.002]	[0.003]	[0.002]	[0.003]	[0.003]						
Log Population	-0.055	-0.112	-0.109	-0.084	-0.017	-0.011						
	[0.061]	[0.066]	[0.069]	[0.052]	[0.063]	[0.049]						
Ethnic	-0.407	-0.216	-0.563	-0.611*	-0.313	-0.579*	0.147	0.147	-0.129	-0.42	-0.256	-0.288
	[0.381]	[0.377]	[0.381]	[0.350]	[0.380]	[0.326]	[0.431]	[0.431]	[0.444]	[0.327]	[0.492]	[0.361]
ODAadj	0.028						0.132					
	[0.171]						[0.087]					
E*ODAadj	-0.008						-0.369					
	[0.212]						[0.347]					
ODAgdp		2.572						6.325**				
		[5.008]						[2.479]				
E*ODAgdp		-3.358						-4.673				
		[7.502]						[10.799]				
NTRgdp			7.36						3.299			
			[6.497]						[4.441]			
E*NTRgdp			-10.295						2.934			
			[8.101]						[24.103]			
NFLgdp				10.237**						4.620***		
				[3.889]						[1.586]		
E*NFLgdp				-14.149**						-11.586		
				[5.642]						[7.822]		
NTRpercap					0.011**						0.001	
					[0.005]						[0.003]	
E*NTRpercap					-0.015**						0.005	
					[0.006]						[0.018]	
NFLpercap						0.011***						0.003*
						[0.002]						[0.001]
E*NFLpercap						-0.015***						-0.008
						[0.004]						[0.017]
Constant	-0.924	-0.482	-0.594	-1.238	-1.305	-1.276	-3.816***	-4.332***	-3.703***	-3.733***	-3.895***	-2.579***
	[1.272]	[1.397]	[1.576]	[1.234]	[1.185]	[0.904]	[0.886]	[0.736]	[0.760]	[0.713]	[1.402]	[0.782]
Observations	57	58	52	55	53	56	59	60	55	58	55	58
Adj. R-squared	0.48	0.64	0.5	0.56	0.54	0.63	0.32	0.52	0.29	0.45	0.23	0.53

Dependent variable is average Rule of Law between 1996 and 2002. E* indicates that variable is interacted with ethnic fractionalization. Ethnic fractionalization and aid variables are centered around their mean. Robust standard errors are in brackets. Attached to coefficients, * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level. Instruments are predicted trade share, log of population, French Colony dummy, Central America dummy, Egypt dummy, arms imports relative to total imports and the interaction terms of these variables with ethnic fractionalization.

Table III.17. Marginal Effect of Aid on Rule of Law

Percentile	Value Ethnic	NFLgdp		NFLpercap		NTRpercap	
		Marg. Effect	Std. Err	Marg. Effect	Std. Err	Marg. Effect	Std. Err
5	0.17	8.928***	2.752	0.010***	0.001	0.009**	0.004
10	0.19	8.670***	2.677	0.010***	0.001	0.008**	0.004
15	0.24	7.920***	2.46	0.009***	0.001	0.008**	0.004
20	0.30	7.100***	2.222	0.008***	0.001	0.007**	0.003
25	0.34	6.458***	2.037	0.007***	0.001	0.006**	0.003
30	0.41	5.393***	1.729	0.006***	0.001	0.005**	0.002
35	0.46	4.661***	1.518	0.005***	0.001	0.004**	0.002
40	0.50	4.180***	1.38	0.005***	0.001	0.004*	0.002
45	0.54	3.540***	1.196	0.004***	0.001	0.003*	0.002
50	0.59	2.856***	1.001	0.003***	0.001	0.003*	0.001
55	0.63	2.193***	0.813	0.002***	0.001	0.002*	0.001
60	0.66	1.886**	0.727	0.002***	0.001	0.002	0.001
65	0.67	1.621**	0.653	0.002***	0.001	0.001	0.001
70	0.71	1.092**	0.509	0.001*	0.001	0.001	0.001
75	0.74	0.725*	0.413	0.001	0.001	0.000	0.001
80	0.77	0.234	0.295	0.000	0.001	0.000	0.000
85	0.79	-0.030	0.244	0.000	0.001	0.000	0.000
90	0.82	-0.511	0.197	-0.001	0.001	-0.001	0.000
95	0.86	-1.113	0.261	-0.002	0.001	-0.001	0.001
DoF		50		50		47	

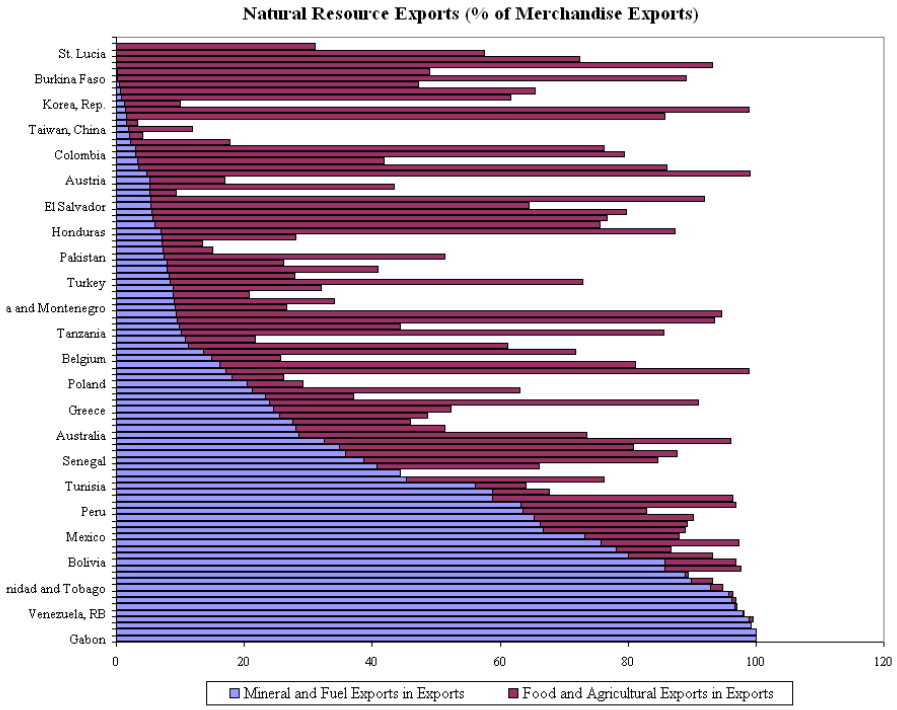
of Table 16. NFLpercap and NTRpercap are expressed in current USD. DoF is Degrees of Freedom. Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

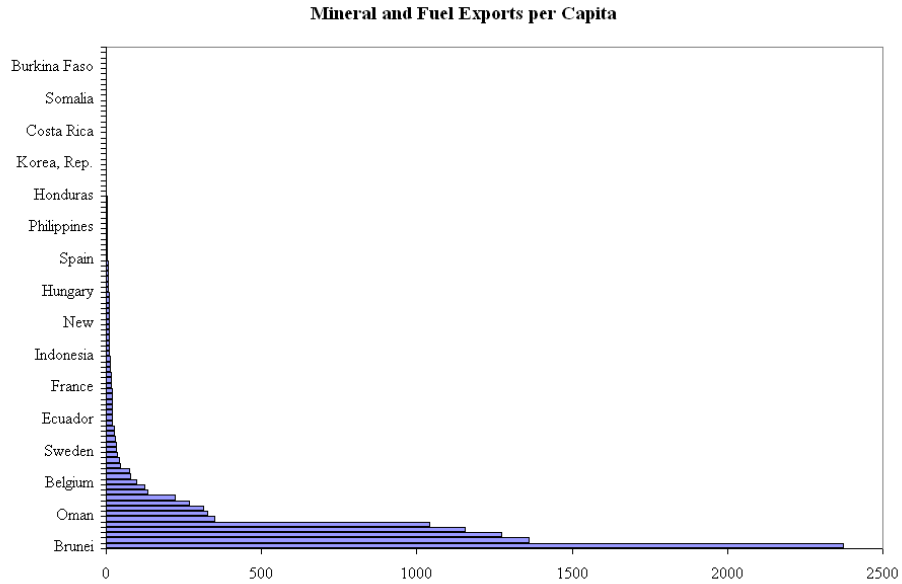
Table III.18. Marginal Effect of Ethnic Fractionalization on Rule of Law (Aid)

Percentile	NFLgdp			NFLpercap			NTRpercap		
	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.	Value	Marg. Effect	Std. Err.
5	0.02	-9.762***	3.53	8.73	-0.013***	0.002	-94.97	-0.004	0.003
10	0.03	-10.733***	3.714	13.57	-0.014***	0.002	-12.95	-0.011*	0.005
15	0.03	-11.002***	3.763	17.30	-0.014***	0.002	3.93	-0.013**	0.006
20	0.03	-11.188***	3.797	20.00	-0.015***	0.002	8.05	-0.013**	0.006
25	0.04	-11.986***	3.935	24.20	-0.015***	0.002	10.92	-0.014**	0.006
30	0.05	-12.670***	4.046	29.08	-0.016***	0.002	14.74	-0.014**	0.006
35	0.05	-13.278***	4.136	32.35	-0.016***	0.002	18.41	-0.014**	0.006
40	0.07	-14.15***	4.237	40.75	-0.017***	0.002	18.80	-0.014**	0.006
45	0.07	-14.356***	4.249	47.36	-0.017***	0.002	22.04	-0.014**	0.006
50	0.08	-14.559***	4.221	54.09	-0.017***	0.002	28.37	-0.015**	0.006
55	0.09	-14.513***	4.19	69.37	-0.017***	0.002	32.40	-0.015**	0.006
60	0.09	-14.438***	4.163	79.63	-0.017***	0.002	35.36	-0.015**	0.006
65	0.09	-14.240***	4.111	90.21	-0.016***	0.003	40.96	-0.014**	0.006
70	0.11	-13.059***	3.905	96.48	-0.015***	0.003	45.30	-0.014**	0.006
75	0.11	-12.730***	3.86	122.12	-0.012***	0.003	48.38	-0.014**	0.006
80	0.13	-10.780***	3.62	132.09	-0.011***	0.003	55.13	-0.013**	0.006
85	0.13	-10.177***	3.549	141.33	-0.010***	0.003	73.01	-0.011**	0.005
90	0.16	-7.117***	3.131	186.13	-0.006**	0.002	101.34	-0.007*	0.004
95	0.28	-1.657	1.779	212.27	-0.004*	0.002	126.75	-0.005	0.003
DoF	51			51			74		

Marg. Effect is estimated marginal effect of variable on Rule of Law. Estimates are obtained from specification B of Table 16. NFLpercap and NTRpercap are expressed in current USD. DoF is Degrees of Freedom. Standard errors are robust. * denotes significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent significance level.

Figure III.1: Natural Resource Exports and Mineral and Fuel Rents per Capita





Appendix

- *Black market premium*

  is defined as black market exchange rate over official exchange rate in 1970.

  Source: Barro and Lee (1993)

- *Cath*

  Percentage of population in a country that belongs to Roman Catholic religion in the world in 1980 scaled from 0 to 100. For countries of recent formation the data is available for 1990 - 1995.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *Compolt*

  Assumes value equal to 1 for countries with genocidal incident that involved ethnic victims or mixed ethnic and political victims.

  Source: Harff and Gurr (1995)

- *dens65c*

  Coastal (within 100km of coastline) population per coastal area in 1965.

  Source: Sala-i-Martin et al. (2003)

- *dtt7090*

  Average annual growth in the log of the external terms of trade between 1970 and 1990 calculated as 100*(1/20)*(LN(TT1990)-LN(TT1970)) with TT equal to the ratio of an export price index to an import price index.

- *Engfrac*

  Fraction of the population speaking English.

  Source: Hall and Jones (1999)

- *Ethnic*

  The fractionalization index is computed one minus the Herfindahl Index of the group share and reflect the probability that two randomly selected individuals from a population belong to a different group.

  Source: Alesina et. al. (2002)

- *Eurfrac*

  Fraction of the population speaking French, Germany, Portuguese and/or Spanish.

  Source: Hall and Jones (1999)

- *FdAgXGDP80*

  Share if exports of food and agricultural raw materials in GDP in 1980.

  Source: World Development Indicators, World Bank

- *FdAgXX80*

  Share if exports of food and agricultural raw materials in total merchandise exports in 1980.

  Source: World Development Indicators, World Bank

- *Latitude*

  The absolute value of the latitude of the country, scaled to take values between 0 and 1.

  Source: CIA Factbook (2003).

- *LOrFr*

  Assumes value one if the legal origin of the Company Law or Commercial Code is French Commercial Code.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- L*OrGe*

  Assumes value one if the legal origin of the Company Law or Commercial Code is German Commercial Code.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *LOrSc*

  Assumes value one if the legal origin of the Company Law or Commercial Code is Scandinavian Commercial Code.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *LOrSoc*

  Assumes value one if the legal origin of the Company Law or Commercial Code is Socialist/Communist Laws.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *lrgdpl70*

  Natural logarithm of real GDP per capita. Reference year is 1996.

  Source: Penn World table 6.1

- *lrgdpWDI*

  GDP per capita in constant 1995 US$ in 1970.

  Source: World Development Indicators, World Bank

- *malfal66*

  Index of prevalence of malaria in 1966.

  Source: Gallup and Sachs (1998)

- *MFuelP80*

  Exports of fuel, natural gas, ores and mineral in USD per capita in 1980.

  Source: World Development Indicators, World Bank

- *MFuelXGDP80*

  Share of exports of fuel, natural gas, ores and mineral in GDP in 1980.

  Source: World Development Indicators, World Bank

- *MFuelXX80*

  Share of exports of fuel, natural gas, ores and mineral in total merchandise exports in 1980.

  Source: World Development Indicators, World Bank

- *Muslim*

  Percentage of population in a country that belongs to Muslim religion in the world in 1980 scaled from 0 to 100. For countries of recent formation the data is available for 1990 - 1995.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *NCapXGDP80*

  Share of natural capital exports in total merchandise exports, defined as the corresponding share of food and agricultural exports and mineral and fuel exports in 1980. Natural capital includes SITC categories 0 (live animals and all unprocessed and processed food products), 1 (beverages and tobacco), 2 (inedible crude materials except fuels), 3 (mineral fuels, lubricants and related materials), 4 (animal and vegetable oil and fats) and 68 (non-ferrous metals).

  Source: World Development Indicators, World Bank

- *NCapXX80*

  Share of natural capital exports in total merchandise exports, defined as the corresponding share of food and agricultural exports and mineral and fuel exports in 1980. See preceding definition, for further information.

  Source: World Development Indicators, World Bank

- *NFLP/NFLgdp*

  NFLP is official net resources flows in 1980 divided by total population. NFLgdp is net resource flows in 1980 divided by GDP in current USD. Official net resource flows are the sum of official net flows on long-term debt to official creditors (excluding IMF) plus official grants (excluding technical cooperation). Net flows (or net lending or net disbursements) are disbursements minus principal repayments.

  Source: World Development Indicators, World Bank

- *NTRP*

  Official net resources transfers in 1980 divided by total population. Official net resources transfers are official net resources flows minus interest payments. Official net resource flows are the sum of official net flows on long-term debt to official creditors (excluding IMF) plus official grants (excluding technical cooperation).

  Source: World Development Indicators, World Bank

- *Official Development Assistance (ODA)*

  Grants or Loans to countries and territories of developing countries which are: (a) undertaken by the official sector; (b) with promotion of economic development and welfare as the main objective; (c) at concessional financial terms [if a loan, having a Grant Element (q.v.) of at least 25 per cent]. In addition to financial flows, grants, loans and credits for military purposes are excluded

  Source: OECD/World Development Indictaors, World Bank

- *OdaAdj*

  OdaAdj is official development assistance to GDP ratio in 1980. Data has been transformed to constant dollars and to purchasing power parity using the IMF's Import Unit Value Index.

  Source: Burnside and Dollar (2004)

- *OWTI*

  Own-import weighted tariff rates on intermediate inputs and capital goods.

  Source: Barro and Lee (1993)

- *OWQI*

  Own-import weighted non-tariff frequency on intermediate inputs and capital goods.

  Source: Barro and Lee (1993

- *P60*

  Enrollment rate in primary education in 1960.

  Source: Barro and Lee (1993).

- *Pi6064*

  Average investment price level between 1960 and 1964 on purchasing power parity basis.

  Source: Sala-i-Martin

- *Prot*

  Percentage of population in a country that belongs to Protestant religion in the world in 1980 scaled from 0 to 100.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *RelOther*

  Percentage of population in a country that belongs neither to Roman Catholic, Muslim nor Protestant religion in the world in 1980 scaled from 0 to 100.

  Source: La Porta, Lopez-de-Silanes, Shleifer, Vishny (1999)

- *Rent80*

  Mineral and fuel rents in 1980. Fuel rents is equal to the product of unit resource rents and the physical quantities of energy extracted. It covers crude oil, natural gas, and coal. Mineral rents is equal to the product of unit resource rents and the physical quantities of minerals extracted. It refers to bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, gold, and silver.

  Source: World Development Indicators, World Bank

- *Revcoup*

  Number of revolutions and coups per year, averaged over the period, 1960-84.

  Source: Barro and Lee (1993)

- *Rule of Law*

  measures the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions. To achieve this it is based on measure that capture the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. The index used in this study is the average over the years 1996, 1998, 2000 and 2002.

  Source: Kaufmann, Kraay and Zoido-Lobaton (2002)

- *Years Open*

  The fraction of years during the period 1970-1979 during which the country is rated as open according to the criteria of Sachs and Warner (1995b).

  Source: Sachs and Warner (1995b)

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