The Origins of Terrorism

Cross-Country Estimates with Discrete Choice and Count Data Methods

January 2006

by

Andreas Freytag*, Jens J. Krüger* and Friedrich Schneider**

*Friedrich-Schiller-University Jena
Department of Economics, Carl-Zeiss-Str. 3, D-07743 Jena, Germany,
Tel.: +49 3641 943 250, Fax: +49 3641 943 252,
E-Mail: a.freytag@wiwi.uni-jena.de, jens.krueger@wiwi.uni-jena.de

**Johannes Kepler University of Linz
Department of Economics, Altenbergerstrasse 69, A-4040 Linz-Auhof, Austria
Tel.: +43-732-2468-8210, Fax: +43-732-2468-28210
E-Mail: friedrich.schneider@jku.at

— — — — — — — DRAFT — — — — — — —

Abstract:

To improve the knowledge about an appropriate anti-terror strategy, it seems reasonable to assess the underlying causes of terror. We examine social and economic conditions in the country of origin of terrorist attacks, claiming that low opportunity cost of terror, e.g. slow growth and poor institutions raise the propensity of terror. Using different discrete choice and count data models, we can show that unfortunate socio-economic conditions in a country may well reduce the opportunity cost for potential terrorist and increase the likelihood and the number of terrorist attacks originating from a specific country.

JEL classification: F15, C25, Z13

Keywords: terror attacks, openness, discrete choice, institutions

1. Introduction

Currently, the prevailing strategy to reduce terrorism, or more dramatic *the war on terrorism* is characterized by the attempt to isolate the terrorists and their supporters. Given that one possible reason for terrorism, e.g. originating from the Arab Peninsula, may be seen in the widespread underdevelopment of Middle East countries, this strategy may prove backfiring. However, terror is not only originating in the Islamic world. Rather, it seems to be a ubiquitous phenomenon. Thus, concentrating on Islamic terrorism and restricting the problem to a religious one does not allow for a comprehensive judgement and adequate policy reactions in the longer run. As a foundation for the development of a sustainable anti-terror strategy, a deeper knowledge of the origins and causes of terrorism is required. In this study we want to contribute some results that may be a part of such a foundation.

Specifically, our study contains a systematic analysis of the origins of terrorism by analyzing the background of terrorists. Special emphasis is devoted to the economic and political situation in those countries where the terrorists are originating from. After a theoretical analysis of terrorists' behavior in section 3, we provide empirical evidence of the driving forces in section 4. Here, the difficulty, of course, is to find reliable data about the origins of terrorism. One difficulty surely is that suicide bombers often cannot be recognized after their attack. In addition, data about terrorism are highly politicized and subject to interpretation. Nevertheless, it is worthwhile to conduct this study given the enormous importance to learn about the motivation of terrorists and their environment against the background of the need for an effective and efficient anti-terror strategy, even if one has to be particularly cautious in interpreting the results. For our empirical estimates we apply discrete choice and count data methods to take account of the special nature of our explanatory variable. The core parts of the paper are surrounded by following section 2 which is dedicated to an overview about the literature and the conclusions in section 5.

2. Related Literature

The economic literature on terror has increased remarkably in recent years. Indeed, it is sensible to argue in terms of economic incentives when politically dealing with terrorism, the question being whether to use "stick or carrot" (Frey 2004). Thus, the literature on terrorism

can be grouped as follows. A number of papers deals theoretically with the causes of terror. A second group analyzes empirical evidence, mainly in the target countries. The focus is laid upon measuring the cost of terror, both on an individual and a collective scale. A third group is dealing with remedies. How can terror be prevented? The latter group is rather of political than of analytical nature and will not further considered in this paper.[1]

The theoretical analyses of terror assume that terrorists behave in principle like other individuals. Terror is chosen as long as the terrorist's marginal benefits exceed marginal costs (Frey and Luchinger 2004). However, killing other people needs more than a simple assessment of cost and benefits. Glaeser (2005) analyzes the economics of hatred as one fundamental incentive to become a terrorist. In his model, hatred is supplied in political competition. The demand depends negatively on citizens's contact to foreigners and minorities. Wintrobe (2003) models the terrorist as an individual choosing between two goods, the intellectual independence and group solidarity. The potential terrorist trades independence against solidarity and a strong leadership. The demand for solidarity makes suicide bombing rational. In other words, the model implicitly argues with the opportunity costs of terror.

Concerning the economic conditions in the Islamic countries as one major source of terrorist attacks, Kuran (2004) emphasizes that the specific institutional procedures in these countries prevented the emergence of the business enterprise for a long time. The institutions implemented instead were a very inefficient substitute to the enterprise. In that way, the Islamic law of inheritance inhibited capital accumulation and the lack of stock markets prevented the possibility of diversification and easy transfer of equity. As a result the emergence of large corporations exploiting economies of scale and scope that allowed to install modern technologies of mass production and thus proved to be central for the development of European capitalist societies (Chandler 1990) has been inhibited. Moreover, Kuran (2004, p. 78) argues that "[a]rbitrary taxation and outright expropriations remained more common in the Middle East, where the state was still considered an extension of the ruler. Bribery was endemic." Those institutional arrangements have been consistently found to be detrimental to economic growth in empirical studies (see e.g. Barro (1997), Knack and Keefer (1995) and Mauro (1995)). Of course, this does not necessarily imply that the business enterprise is incompatible with the Islam, but it did not emerge under the rule of Islamic law.

[1] Exceptions are Frey (2004) and Sandler (2003).

The empirical literature is also wide. Enders and Sandler (2005) analyze the autoregressive nature of the level of terrorist attacks. Apart from this paper, the bulk of the literature focuses mainly on the target countries of terrorists. Gupta et al. (2002) show the enormous fiscal burden of terrorism and armed conflict for low- and middle-income countries. Tavares (2003) shows that economic prosperity attracts terrorist attacks. Terrorist attacks are significantly correlated with GDP per capita, the growth rate of GDP and linguistic variety. Crain and Crain (2004) discuss the welfare cost of terror attacks for the target countries, focusing on the United States. This evidence is supported on an individual level by Krug and Reinmöller (2003) who discuss the costs of transnational terrorism for corporations and the implications for corporate decision-making. With respect to counterterrorism and its feedback effects on the country of origin, Fratianni and Kang (2005) using a gravity model show that increasing border security is likely to decrease trade between the country of origin and the target country of terrorist attacks, thereby probably reducing economic welfare in the country of origin and raising sentiments against the west. Following our theoretical reasoning below, this in turn diminishes opportunity cost of potential terrorists.

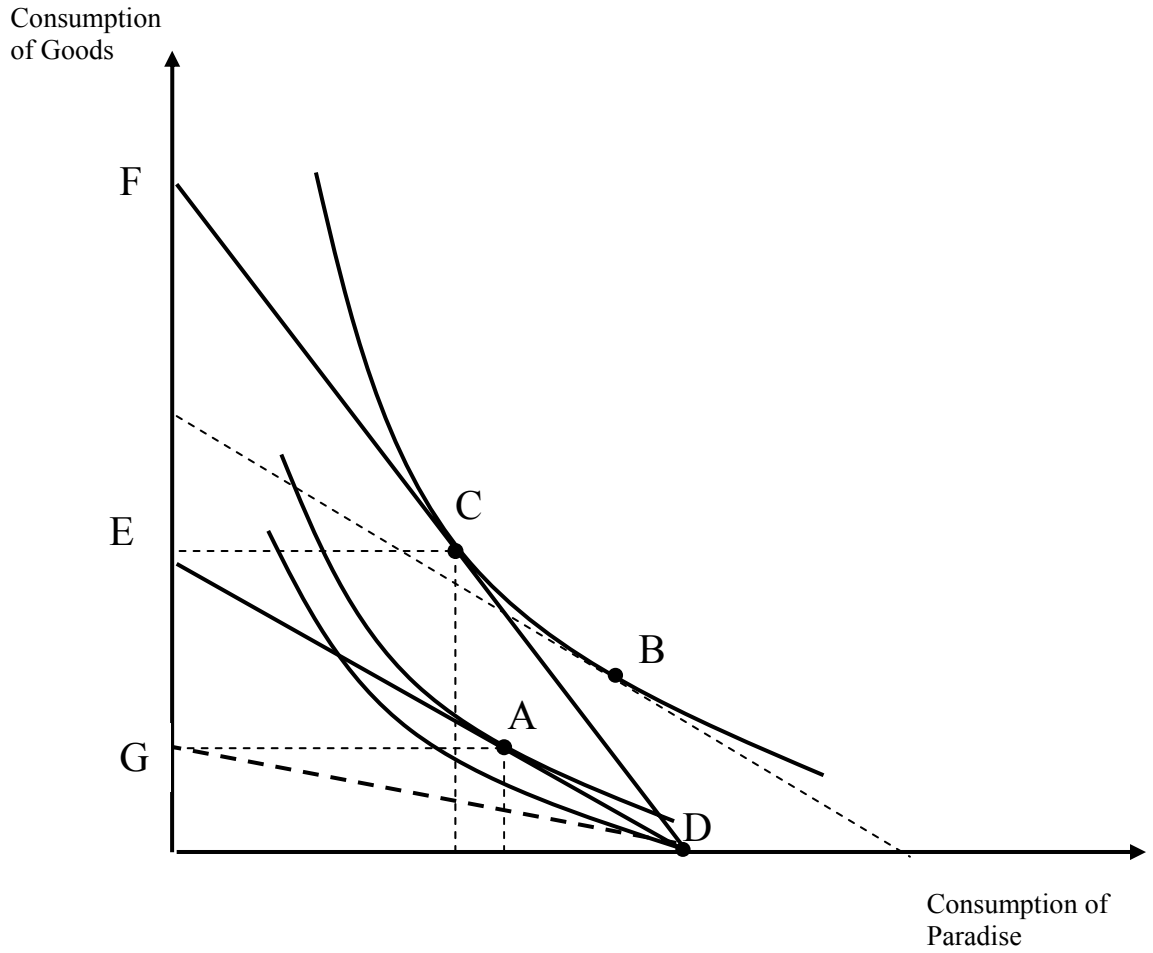
3. Theoretical Motivation: Opportunity Cost of Terror

In this paper we contribute to this literature by asking theoretically for the causes of terror in a simple microeconomic framework and subsequently investigating some of the implications empirically. The predisposition of an individual to become a terrorist is assumed to depend on the opportunity cost of terror. These in turn depend on the social and economic situation in the individual's home country. Our theoretical model is based on Wintrobe's (2003) idea of analyzing the trade-off between independence and solidarity. In that framework the opportunity cost of terrorism can be illustrated quite easily. The two goods in our model are individual wealth on earth and hope for paradise for the terrorist. The suicide bomber is assumed to perceive life on earth as less useful than the promises of the move into paradise after a violent death.

We distinguish between two choices, namely the decision to become a terrorist or not. Analogous to the analysis of income and substitution effects in microeconomics, this decision can be analyzed in terms of the different utilities derived from either living in peace (and making a living on earth) or engaging in activities that lead to a terror assault (and thereby

qualifying for paradise). In figure 1 consider an original budget constraint, represented by the line DE, together with some indifference curves. The individual's utility is maximized in A. If life on earth becomes more attractive, the budget constraint moves to DF. In the case of the given preferences, utility is maximized now in C (with B showing the income effect). The individual prefers more consumption on earth and less activities related to terror. The opportunity cost of terrorist activities have risen. If the opportunity costs decrease by a sufficiently large amount so that the budget constraint moves to DG, a corner solution is reached and utility is maximized in D. In that case the individual chooses to commit a suicide bombing.

Figure 1
Choice between the Consumption of Goods and Paradise



Proceeding from here, we can state the "decision problem" in another way. Suppose that the utilities from being peaceful and from being a terrorist are assumed to depend linearly on the same set of social and economic characteristics of the country of origin. These considerations

directly lead to the construction of a random utility model that can be statistically analyzed with discrete choice techniques. Formally, the values of these characteristics for country *i* are summarized in the vector $\mathbf{x}_i$. The utility derived from either peace *p* or an assault *a* are random variables U_i^p and U_i^a that depend linearly on the country characteristics and a choice-specific error term. Thus,

$$U_i^p = \mathbf{x}_i'\boldsymbol{\beta}_p + u_i^p$$

is the random utility from peace, where $\boldsymbol{\beta}_p$ is a vector of parameters capturing the influence of the country characteristics and u_i^p is an error term. Analogously, the random utility from an assault, depending on the same set of country characteristics can be stated as

$$U_i^a = \mathbf{x}_i'\boldsymbol{\beta}_a + u_i^a .$$

In discrete choice analysis it is assumed that an assault is preferred over peace if $U_i^a > U_i^p$ or, equivalently, if the difference of the utilities is positive, $U_i^a - U_i^p > 0$. In this case we observe at least one terror assault originating from country *i* in our data and record $y_i = 1$, otherwise $y_i = 0$. This allows to link the unobservable difference of the utilities to the country characteristics by the conditional probability

$$\Pr(y_i = 1|\mathbf{x}_i) = \Pr(U_i^a - U_i^p > 0|\mathbf{x}_i) = \Pr(\mathbf{x}_i'\boldsymbol{\beta}_a + u_i^a - \mathbf{x}_i'\boldsymbol{\beta}_p - u_i^p > 0|\mathbf{x}_i) .$$

Substituting $\boldsymbol{\beta} = \boldsymbol{\beta}_a - \boldsymbol{\beta}_p$ and $u_i = u_i^a - u_i^p$ this can be rewritten as

$$\Pr(y_i = 1|\mathbf{x}_i) = \Pr(\mathbf{x}_i'\boldsymbol{\beta} + u_i > 0|\mathbf{x}_i) = \Pr(u_i > -\mathbf{x}_i'\boldsymbol{\beta}|\mathbf{x}_i) .$$

As a last step we assume normality of the error term to reach the final form of the probit model of binary choice

$$\Pr(y_i = 1|\mathbf{x}_i) = 1 - \Phi(-\mathbf{x}_i'\boldsymbol{\beta}) = \Phi(\mathbf{x}_i'\boldsymbol{\beta}),$$

where $\Phi(\cdot)$ denotes the cumulative distribution function of the standard normal distribution. The restriction to standard normality is innocuous here if an intercept is included in the specification. Other distributional assumptions could also be imposed. The alternative

assumption of a logistic distribution of the error term, for example, would result in the logit model.

Our data contain more information than just the fact of a terror assault occurring, actually we have the number of terror assaults originating from a specific country during the years 2000 to 2002. This allows us to form an ordinal classification of the number of terrorist assaults instead of dichotomizing the number of terror assaults into the categories zero and at least one terror assault. The classification chosen here consists of recording 0 in the case of zero terror assaults, 1 for a single terror assault, 2 for two terror assaults, 3 for three to ten terror assaults and 4 for more than 10 terror assaults. In the binary choice model discussed above the utility difference was a latent variable that can be interpreted as the propensity of a terror assault or, alternatively, as a movement along the abscissa of figure 1. The same latent variable can be related to the interval classification just introduced by assuming that the five parts of the classification provide a partition of the range of the latent variable y_i^*, denoting the propensity of a terror assault, according to the definition

$$y_i = \begin{cases} 0 & \text{if} \quad y_i^* \le 0 \\ 1 & \text{if} \quad 0 < y_i^* \le \gamma_1 \\ 2 & \text{if} \quad \gamma_1 < y_i^* \le \gamma_2 \\ 3 & \text{if} \quad \gamma_2 < y_i^* \le \gamma_3 \\ 4 & \text{if} \quad \gamma_3 < y_i^* \end{cases}$$

where $\gamma_1, \gamma_2, \gamma_3$ are the threshold parameters of the partition with $0 < \gamma_1 < \gamma_2 < \gamma_3$. Again the assumption that all are positive is innocuous in the presence of an intercept in the vector of explanatory variables. The normality assumption of the error terms of the regression model then allows to state the probabilities of the categories as

$$\begin{aligned} \Pr(y_i = 0) &= \Phi(-\mathbf{x}_i'\boldsymbol{\beta}) \\ \Pr(y_i = 1) &= \Phi(\gamma_1 - \mathbf{x}_i'\boldsymbol{\beta}) - \Phi(-\mathbf{x}_i'\boldsymbol{\beta}) \\ \Pr(y_i = 2) &= \Phi(\gamma_2 - \mathbf{x}_i'\boldsymbol{\beta}) - \Phi(\gamma_1 - \mathbf{x}_i'\boldsymbol{\beta}) \\ \Pr(y_i = 3) &= \Phi(\gamma_3 - \mathbf{x}_i'\boldsymbol{\beta}) - \Phi(\gamma_2 - \mathbf{x}_i'\boldsymbol{\beta}) \\ \Pr(y_i = 4) &= 1 - \Phi(\gamma_3 - \mathbf{x}_i'\boldsymbol{\beta}) \end{aligned}$$

These probabilities are used to build the loglikelihood function which is maximized numerically with respect to $\boldsymbol{\beta}$ and $\boldsymbol{\gamma} = (\gamma_1, \gamma_2, \gamma_3)'$. See Davidson and MacKinnon (2004, ch. 11) or Greene (2000, ch. 19) for more details on binary and ordered probit models.

Taking the information in the data even more literally, count data regression models are also applicable here. We estimate a regression model based on the negative binomial distribution (NegBin) which weakens the restriction of the Poisson model that the mean is equal to the variance. Since the number of countries with a zero count of terror assaults may be larger than is compatible with the negative binomial distribution, we also consider a zero-inflated Poisson model (ZIP) where an additional parameter is introduced that gives the model the flexibility to account for an excessive number of zeros. As the next section shows, it is exactly this excessive number of zeros in the dependent variable that characterizes our data. Cameron and Trivedi (1998) give a complete overview over these two models and all aspects of the regression analysis of count data.

4. Data and Results

The data for the number of terror assaults during 2000 to 2002 originating from a country are from ITC (2004), an Israeli think tank. The data cover about half of all reported terror attacks during this time span (488 out of 986, US State Department 2003).[2] From these data three variables are constructed, representing the binary, ordinal or count data information. In the following, these are called DTERROR, CTERROR and STERROR, respectively (referring to dummy, classification and sum). The classification of the ordinal indicator is detailed in the previous section in the introduction of the ordered probit model.

The data for the explanatory variables are assembled from various data sets that are frequently used in the literature on cross-country growth regressions. These consist of updates of the Penn World Table (PWT, now version 6.1), an earlier version being described in Summers and Heston (1991) and various other sources. In particular the explanatory variables used in the regressions are:

[2] Detailed data of more terrorist attacks are currently not available for the authors.

- openness to international trade is quantified by the variable OPENK from the PWT 6.1 (exports plus imports divided by GDP, constant prices, in percent); used is the mean of all observations from 1980 to 2000;

- material wealth in the economy is quantified by the variable RGDPCH from the PWT 6.1 (real GDP per capita, constant prices, chain index); used is the mean of all observations from 1980 to 2000;

- capital accumulation in the economy is quantified by the variable KI from the PWT 6.1 (investment share of GDP, constant prices, in percent); used is the mean of all observations from 1980 to 2000;

- consumptive governmental expenditures in the economy is quantified by the variable KG from the PWT 6.1 (government share of GDP, constant prices, in percent); used is the mean of all observations from 1980 to 2000;

- human capital is measured by the average schooling years in the total population older than 15 years in the year 1999, taken from an updated version of the data set of Barro and Lee (1993, 1996);

- Muslim religion is quantified by a dummy variable that is equal to unity if the fraction of Muslims in the total population exceeds 50 per cent (based on the CIA World Fact Book 2005);

- fraction of the population below age 15 in the year 2003 is taken from Heinsohn (2003), we assume a constant age structure of the population between 2000 and 2003;

- total population in the year 2000 is quantified by the variable POP from the PWT 6.1 (population in 1000);

- the indicator for the quality of institutions in a country is quantified by the indicator GADP (government anti-diversion policy) of Hall and Jones (1999);

- the classification of the economic organization in a country is quantified by the indicator EcOrg of Hall and Jones (1999);

- inequality is quantified by the Gini coefficient taken from Deininger and Squire (1997).

The following table 1 presents some descriptive statistics. Reported are (from the right to the left) the arithmetic mean, the standard deviation, skewness, kurtosis, minimum and maximum values and the number of cases available for each variable. The figures show that there is substantial variation of the data across the sample countries. For the topic of this paper particularly interesting is the variable STERROR, representing the total number of terror assaults originating from a country during 2000-2002. It ranges from a minimum of zero to a maximum number of 32 with a mean of 1.58. The distribution of this variable is highly skewed with more than 75 percent of the countries (96 cases) with no terror assaults originating from and only 8 countries altogether with more than 5 assaults.

Table 1
Descriptive Statistics

	Mean	Std.Dev.	Skew.	Kurt.	Min.	Max.	#Cases
DTERROR	0.26	0.44	1.08	2.16	0	1	130
CTERROR	0.60	1.19	1.83	4.93	0	4	127
STERROR	1.58	4.81	4.10	20.75	0	32	127
openness	71.96	43.11	1.89	7.90	12.46	275.15	125
gdp/capita	7747.80	7115.61	1.01	2.81	529.15	27930.40	125
investment ratio	14.81	7.39	0.73	3.87	2.75	44.14	125
government ratio	20.49	9.73	1.09	5.27	5.71	63.93	125
human capital	6.35	2.79	0.07	2.18	0.84	12.05	99
Muslim religion	0.22	0.41	1.38	2.89	0	1	130
fraction under age 15	0.32	0.11	-0.17	1.62	0.14	0.51	100
population	51285.00	159763.00	6.30	44.22	240	1260000	105
GADP	0.62	0.20	0.39	2.33	0.23	1	119
EcOrg	3.21	1.57	-0.57	2.34	0	5	121
Gini coefficient	40.07	9.96	0.41	2.26	19.90	62.30	107

With these variables the four models (binary probit, ordered probit, negative binomial count, zero inflated Poisson count) are estimated. The results for our preferred specification of explanatory variables are assembled in table 2. All estimates are generated by the Limdep package (version 7.0). The figures above the dashed line in the table are the estimates for the regression parameters with the corresponding p-values for the two-sided standard t-test in parentheses. Below the dashed line the estimates of special parameters are reported that appear in the ordered probit model ($\gamma_1, \gamma_2, \gamma_3$), in the NegBin count data model (α) or in the zero-inflated count data model (τ). The following interpretation concentrates on the results of the regression parameters.

Table 2
Estimation Results

	Binary Probit	Ordered Probit	NegBin Count	ZIP Count
Intercept	-71.8622	-39.3125	-65.6129	-5.7575
	(0.0014)	(0.0714)	(0.0842)	(0.4843)
log(openness)	21.7362	12.9353	18.0978	5.9932
	(0.0043)	(0.1389)	(0.2016)	(0.0249)
log(openness)^2	-2.8582	-1.7023	-2.4348	-0.8829
	(0.0051)	(0.1577)	(0.2154)	(0.0142)
log(gdp/capita)	-0.1750	0.0309	1.1254	-1.1242
	(0.8265)	(0.9757)	(0.5585)	(0.0049)
log(investment ratio)	1.5632	0.4606	-0.0177	-0.3690
	(0.0417)	(0.7051)	(0.9926)	(0.2295)
log(government ratio)	3.9111	1.7729	2.7723	-0.9210
	(0.0016)	(0.0583)	(0.1169)	(0.0475)
log(human capital)	0.0670	0.4104	-0.1097	2.6426
	(0.9479)	(0.8080)	(0.9670)	(0.0003)
Muslim religion	-0.1405	0.0852	0.0118	0.8654
	(0.8765)	(0.9281)	(0.9942)	(0.0573)
log(fraction under 15)	-5.1201	-2.3713	-3.4202	-0.1697
	(0.0371)	(0.3386)	(0.4086)	(0.8114)
log(population)	1.3784	0.6964	1.1438	0.4223
	(0.0139)	(0.0787)	(0.0768)	(0.0000)
log(GADP)	-6.9104	-4.3590	-6.4167	-0.1477
	(0.0065)	(0.0524)	(0.0716)	(0.8808)
EcOrg	0.5062	0.4841	0.6794	0.5825
	(0.0288)	(0.0114)	(0.0509)	(0.0000)
log(Gini coefficient)	-2.3217	-1.7368	-1.6276	-0.3230
	(0.1462)	(0.3852)	(0.6538)	(0.5149)
γ_1		0.3161		
		(0.0619)		
γ_2		0.8623		
		(0.0020)		
γ_3		1.6136		
		(0.0002)		
α			2.4839	
			(0.0081)	
τ				-0.0017
				(0.9869)
log L	-18.2985	-53.7543	-95.9367	-133.8443
McFadden-R^2	0.5971	0.3122	0.4015	0.4335
n	71	71	71	71

Note: p-values are shown in parentheses.

Turning first to the results of the binary probit model we observe that openness exerts a highly significant positive effect on the propensity of terror which is also of a considerable magnitude. But these positive effects begin to decline after a certain critical level of openness as the significantly negative coefficients of log(opennes) squared shows. The critical level is at an openness of about 45 which is below the mean of the sample (see table 1 above). The overall effect openness remains positive in the relevant range of values since it requires openness levels of above 2000 to let the total effect be negative which is not sensible and far beyond the maximum value of openness observed in the sample (again refer to table 1).

Concerning the other explanatory variables the influence of (log) per capita income is negative but only of small magnitude and far from being significant. The (log) investment and government consumption ratios appear to be both terror stimulating and statistically significant with a quantitatively larger coefficient value of government consumption. Human capital is positively (but insignificantly) related to terror. Somewhat surprising is the negative (but insignificant) impact of the dummy variable for Muslim religion. Since many terror attacks in these years originate from those countries it appears to be the case that it is not so much the Islam itself, but more the specific economic and social conditions in these countries which are captured by the other explanatory variables that are responsible for the propensity of terror.

The number of younger people, measured by the fraction of population under 15, appears to reduce the propensity of terror significantly. In other words, an ageing population is more favorable for terror compared to a surplus of possibly unemployed young men as often claimed (Heinsohn 2003). However, the pressure caused by the size of the total population in a country appears to be increasing the propensity of terror. In a nutshell, a large but ageing population has a significantly reducing impact on the opportunity cost of terror. As in many growth regressions the variable GADP, reflection the quality of institutions in a country, is significantly negative with a very low p-value. A more liberal and market oriented economic organization, corresponding to a higher value of EcOrg, acts as a significantly positive explanatory variable. This may reflect that market orientation in a poor institutional setting does not strengthen citizen's confidence in their own ability to master their life. Finally, the coefficient estimate for the Gini coefficient reveals that higher inequality is associated with a lower propensity of terror, possibly due to a more repressive regime in the country. But this is

not significant at conventional levels. The overall explanatory power of the regression is quite reasonable as indicated by McFadden's R^2.

The picture gained from the ordered probit model is largely similar, but less convincing, compared to that of the binary probit model. Since the dependent variable can here also be interpreted as the propensity of terror no new insights arise. The significance of the results is somewhat weakened as indicated by the higher p-values compared to the binary model. Exploiting the count data nature of our explanatory variable estimating the NegBin model gives results that are roughly comparable to those of the ordered probit model in terms of the signs and the significance of the parameters. The significance of the estimate of the alpha parameter points toward overdispersion and supports the application of the NegBin model instead of the Poisson model.

The last column of the table contains the results for the zero-inflated Poisson count data model which seems to be most appropriate here in view of the excessive number of zero observations. In that case most explanatory variables, with the exception of the investment ratio, the population structure, institutions and distribution, are different from zero on quite high significance levels. Some inferences from the ordered probit model remain robust here and are even more forceful. The quadratic effect of openness is the same as before and the level of openness associated with the maximum effect is here at about 30. Less income per capita and a dominating (positive sign) Muslim religion lead to more terror assaults. The population variable and the type of economic organization exert similarly strong effects on the number of terror assaults as they did before on the propensity of terror assaults in the probit models, but the impact of the age structure is less powerful. The indicator for the quality of institutions loses significance her, however, and drops in magnitude substantially. Government spending in this specification has a significantly negative impact on terror, which supports our theoretical idea and can be interpreted as follows: higher government spending is largely equivalent to higher social expenditure, improving the economic conditions and thereby increasing opportunity cost of terror. This negative effect appears to be not as strong as the positive effect in the binary probit model, however. So we are faced with opposing effects of government spending on the inclination to at least one terror assault and the count measure of all assaults between 2000 and 2002.

5. Conclusion

The results of our econometric analysis do indeed support the theoretical reasoning. The proxies chosen to reflect the opportunity cost of terror have an impact on terrorist assaults. Despite some puzzling results such as a positive impact of openness on terror (which may be less significant if only non-oil exports are covered), we find that terrorist activities are driven by socio-economic factors such as GDP per capita, population size and age structure as well as the institutional setting. This evidence does allow for modest policy conclusions deviating from a rigid and almost violent counterterrorist strategy, at least in the medium and long run. Four elements of a rational anti-terror policy are outlined, aiming at increasing opportunity cost of terrorism.

First, the treatment of terrorists, both imprisoned and still active has to be in accordance with the rule of law. A tough, brutal and hysteric reaction in target countries of terrorism also creates scapegoats for the countries of origin. Their poor economic performance allegedly can be traced back to other countries' activities such as economic sanctions or other hostile measures. Thus, the opportunity cost of terror can be kept high by moderate reactions, martyrdom can be reduced to a minimum. Second, despite the curios results with respect to openness, it may also be helpful to assess trade policy in the US and the EU towards the developing world under the given perspective. Third, institutions matter. Therefore, support for those forces in the countries in question who favor reform and modernization should be given. However, the actual implementation of the support is a tricky issue. If the support is perceived as being an imperialistic attack – e.g. because it is supported by military force – the opposite of the intended result may happen. Instead of supporting reformers, terrorists who do not have an interest in the improvement of the economic situation at all may be strengthened by this strategy. Nevertheless, overcoming the institutional trap seems decisive for both the economic success of a country and for the fight against terrorism. Finally, the financial means of terrorist groups have to be reduced. This again is a very important issue, which can be seen when looking at the financial sources of Al Qaeda. Following serious estimations, roughly a third of the financial flows stems from drug business, another fourth is given by private and government donations, the rest stems from illegal activities such as blackmailing and illegal trading (mainly diamonds) (Schneider 2004). Thus careful attention has to be given to these issues. In addition, the first three pillars of the strategy suggested here will also contribute to decreasing financial sources.

References

Barro, R.J. (1997), Determinants of Economic Growth: A Cross-Country Empirical Study, Cambridge (Mass.): MIT Press.

Barro, R.J., Lee, J.-W. (1993), International Comparisons of Educational Attainment, Journal of Monetary Economics 32, 363-394.

Barro, R.J., Lee, J.-W. (1996), International Measures of Schooling Years and Schooling Quality, American Economic Review, Papers and Proceedings 86, 218-223.

Cameron, A.C., Trivedi, P.K. (1998), Regression Analysis of Count Data, Cambridge (Mass.): Cambridge University Press.

Chandler, A.D. (1990), Scale and Scope: The Dynamics of Industrial Capitalism, Cambridge (Mass.): Harvard University Press.

CIA (2004), *The World Factbook*, http://www.cia.gov/cia/publications/factbook/geos/gz.html, Internet search of September 23, 2004.

Crain, N.V, Crain, W.M. (2004), Terroized Economies, Paper presented at the Public Choice Outreach Conference, George Mason University, June 3-6, 2004.

Davidson, R., MacKinnon, J.G. (2004), Econometric Theory and Methods, Oxford: Oxford University Press.

Deininger, K., Squire, L. (1997), A New Data Set Measuring Income Inequality, World Bank Economic Review 10, 565-591.

Enders, W., Sandler, T. (2005), Transnational Terrorism 1968-2000: Thresholds, Persistence, and Forecasts, Southern Economic Journal 71, 467-482.

Fratianni, M., Kang, H. (2005), Borders and International Terrorism, M. Fratianni, J.J. Kirton, A.M. Rugman and P. Savona (eds.), New Perspectives on Global Governance. Why America Needs the G8, Aldershot: Asgate, 119-133.

Frey, B.S., Luechinger, S. (2004), Decentralization as a Disincentive for Terror,: European Journal of Political Economy 20, 509-515.

Frey, B.S. (2004*), Dealing with Terrorism – Stick or Carrot*, Cheltenham and Northampton: Edward Elgar.

Glaeser, E.L. (2005), The Political Economy of Hatred, Quarterly Journal of Economics, 45-86.

Greene, W.H. (2000), Econometric Analysis, 4th ed., New Jersey: Prentice Hall.

Gupta, S. et al. (2002), Fiscal Consequences of Armed Conflict and Terrorism in Low- and Middle-Income Countries, IMF Working Paper, WP/02/142.

Hall, R.E., Jones, C.I. (1999), Why Do Some Countries Produce So Much More Output per Worker than Others?, Quarterly Journal of Economics 114, 83-116.

Heinson, G. (2003), Warum werden sie zu Kriegern? Männerüberschuß als Kriegpotential, mimeo.

International Policy Institute for Counter-Terrorism (2004), Website, http://www.ict.org.il/, Internet search of September 24, 2004, quoted as ICT.

Knack, S., Keefer, P. (1995), Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures, Economics and Politics 7, 207-227.

Krug, B., Reinmoeller, P. (2003), The Hidden Costs of Ubiquity: Globalisation and Terrorism, Erasmus Research Institute of Management, ERS-2003-062-ORG.

Kuran, T. (2004), Why the Middle East is Economically Underdeveloped: Historical Mechanisms of Institutional Stagnation, Journal of Economic Perspectives 18, 71-90.

Mauro, P. (1995), Corruption and Growth, Quarterly Journal of Economics 110, 681-712.

Sandler, T. (2003), Collective Action and Transnational Terrorism, The World Economy 26, 779-802.

Schneider, F. (2004), The Financial Flows of Islamic Terrorism, D. Masciandaro (ed.), Global Financial Crime – Terrorism, Money Laundering and Offshore Centres, Aldershot und Burlington, 97-123.

Summers, R., Heston, A. (1991), The Penn World Table (Mark 5): An Expanded Set of International Comparisons 1950-1988, Quarterly Journal of Economics 106, 327-368.

Tavares, J. (2003), The Open Society Assesses Its Enemies: Shocks, Disasters and Terrorist Attacks, Universität Lissabon, mimeo.

US State Department (2003), Patterns of Global Terrorism, 2003 Report, Appendix G, revised 2004, http://www.state.gov/s/ct/rls/pgtrpt/2003/33777.htm, Internet search of October 1, 2004.

Wintrobe, R. (2003), Can Suicide Bombers be Rational?, University of Western Ontario, mimeo.