

# Terrorist Recruitment and the State of the Economy

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## Abstract

We analyze whether economic conditions influence the recruitment patterns of Kurdish terrorists. Using a unique panel data set on deceased Kurdish PKK members covering 22 regions and the years 1990 to 2000 we show that terrorist recruitment increases with unemployment and decreases with GDP per capita. However, economic factors are less effective in PKK strongholds and they cannot explain the geographical concentration of recruitment pointing to the importance of other important determinants for recruitment.

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*Keywords:* Terrorism, Kurdish militants, terrorist recruitment, terrorism and economic conditions

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## 1. Introduction

Does a bad economy breed terrorism? If so, economic aid, along with good economic policies, would directly contribute to the fight against terror; if not, resources to fight terror would better be put to other uses such as additional law enforcement and counterterrorist units. Unfortunately this issue is still moot. Krueger (2007: 48ff) argues that terrorists are predominately motivated by religious or political fanaticism and thus economic conditions play little role in terror recruits' decisions to join a terror organization. In contrast, de Mesquita (2005) argues, in the spirit of Becker's (1968) approach to the economics of crime, that economic incentives matter also for potential terrorists. If opportunity costs of becoming a terrorist decline in the course a recession potential terrorists are more inclined to join the ranks of a terrorist group. So far we have no direct evidence on whether a bad state of the economy leads to more terror recruits. Related evidence is contradictory.

Quantitative evidence on the nature of terrorists is still fragmented and possibly not representative, but interesting pieces of evidence do exist. Berrebi (2003) using a sample of 285 "martyrs" from *Hamas* and *Palestinian Islamic Jihad* for the time 1987 – 2002 shows that terrorists are better educated and have a higher economic status than the average of the pool from which they have been drawn. Krueger and Maleckova (2003) find that 129 members of *Hezbollah's* military wing who died in action in 1982 – 1994 also had a higher educational attainment and were better off economically than their non-terrorist counterparts. The same holds true for a sample of 27 extremist Jewish settlers. Yet does a higher economic and educational status of terrorists imply that potential terror recruits are not responsive to changing economic conditions? We do not know. It could very well be that the relative returns of terrorists and of alternative occupations change more for better educated people than for the have-nots and thus the former respond more to changing conditions than the latter.<sup>1</sup> Potential terrorists could also be motivated by ill-guided compassion for their fellow countrymen and thus the urge to change their lot by becoming a terrorist could be stronger during harder times.

Related evidence refers to a possible correlation between economic conditions and the occurrence of violent crimes or the existence of hatred groups. Jefferson and Pryor (1999) find no correlation between the existence of hatred groups and the unemployment rate or the income gap between whites and blacks, among other things. Green et al. (1998) find hate crimes against ethnic groups or homosexuals to be uncorrelated with unemployment in New York 1987 – 1995. Krueger and Pischke (1997) find no correlation between unemployment and ethnic violence in reunified Germany, once they insert a dummy for former East Germany in the regression. Contrary to these findings Honacker (2008) finds unemployment among Protestants and Catholics to be a leading cause of the violence by respective factions in Northern Ireland. Yet, do terrorists tick in the same way as members of the analyzed hatred groups? Again, we do not know.<sup>2</sup>

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<sup>1</sup> Such an argument is in the spirit of Becker's approach to crime and punishment (Becker 1968); yet we do not know whether terrorists are similarly motivated as criminals or overwhelmingly driven by hatred or religious fanaticism and not responsive to economic incentives.

<sup>2</sup> Additional evidence points towards an inverse relationship between the incidence of civil war and GDP per capita (Fearon and Laitin 2003), the growth rate of GDP (Collier and Hoeffler 2000), or negative shocks due to lack in rainfall (Miguel et al. 2004). Contrary to that Oster (2004) finds that witchcraft trials were more common in times of bad weather which was associated with bad economic conditions.

A third, quite small strand of literature looks the relationship between economic conditions and terror acts. In a negative binomial regression model explaining the number of international terrorist events Krueger and Maleckova (2003) find that GDP per capita and the number of terrorists emanating from a country are insignificantly negatively related after controlling for population, religious composition and civil liberties.<sup>3</sup> Bloomberg et al. (2004) use a panel data set of 127 countries for 1968-91 and find that the incidence of terror acts increases in economic downturns in high-income, democratic countries whereas for low-income countries with weak institutions coups, civil wars, and other forms of conflict are more likely in bad economic times.<sup>4</sup> By their nature these cross-country comparisons are potentially plagued by unobserved heterogeneity which may cause omitted variable biases and thus causal inference is somewhat tentative.<sup>5</sup>

In a theoretical model de Mesquita (2005) seeks to reconcile the empirical finding by Berrebi (2003) and Krueger and Maleckova (2003) that terrorists are relatively well off and well educated with the observation that economic recessions are correlated with larger incidences of terrorism (Bloomberg et al. 2004) and violence (Honacker 2008). He argues that terror organizations screen applicants for quality, selecting the best educated share of volunteers; the pool of volunteers however is dependent on economic conditions as these determine the opportunity costs of becoming a terrorist. Economic downturns will thus increase the pool of volunteers and enhance the terror organization's possibility to recruit well educated individuals.

Empirical evidence on the influence of economic conditions on terrorism is inconclusive. The reason for this is the lack of adequate data. This deficiency refers not only to the accuracy and completeness of the data, but also to the nature of the data. We argue that de Mesquita's idea rightly refers to the *recruitment* of terrorists, not the terrorist act as such. The decision to join a terror group may be influenced by alternative economic opportunities whereas the terror acts may not be linked closely to economic conditions: They may depend on terrorists' opportunities to attack valuable targets, political events such as elections or upcoming foreign policy decisions and other government policies.<sup>6</sup>

Our unique data set allows us to link recruitment numbers directly to prevailing economic conditions. We have created a panel data set for 1,650 Kurdish PKK terrorists with information on year and location of joining the PKK so that we are able to relate local economic conditions to recruitment numbers in a region covering the years 1987 to 2001 and the most important regions of PKK recruitment on Turkish soil.<sup>7</sup> Since we look only at recruitments of people born in Turkey, the

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<sup>3</sup> They write: "*The cross-country evidence that we have assembled suggests that, once civil liberties are taken into account, a country's income level is unrelated to the number of terrorists who originate from that country, although we consider the connection between poverty at the national level and terrorism a fertile area for future research.*" (p 142)

<sup>4</sup> Im et al. (1987), Enders and Sandler (1995, 2000) and Berrebi and Lakdawalla (2007) analyze the time pattern of terror acts, however without relating it to economic conditions.

<sup>5</sup> Multicollinearity is another issue: For instance, economic conditions may be correlated with civil liberties or other characteristics of the political system and thus we may not be able to identify the root causes correctly.

<sup>6</sup> Moreover it takes time to train new recruits so that higher recruitment need not translate directly into higher terror activity. In a related paper (Kis-Katos et al. 2008) we show that the probability to survive the first year as PKK members is very high indicating that it takes time before individuals actively take part in the fighting.

<sup>7</sup> Some would argue that PKK fighters are 'militants' or even 'freedom fighters' rather than terrorists as they fight the Turkish army occupying their territory. We do not want to engage in this debate; we note that the PKK is different in motivation and tactics from Islamist terrorist groups; yet they regularly carry out terrorist acts

political system, the institutional setup, and the media environment are equal for all individuals in our data set and the religious composition is similar across the regions. We thus minimize the problem of unobserved heterogeneity inherent in cross-country analyses. In all likelihood the decision to join a terrorist group is to a large extent politically or religiously motivated and not just a pure economic decision; our approach acknowledges that and allows us to identify whether *differences* in economic conditions influence recruitment in addition to other factors. We find terrorist recruitment to be affected by economic conditions: It rises with unemployment and declines with regional GDP. Interestingly, the influence of economic variables is stronger in the periphery than in the terrorist strongholds.

We proceed as follows. In the next section we describe the history of the PKK in a nutshell. Section 3 introduces the data and the empirical approach; Section 4 presents the results. Section 5 summarizes and concludes.

## **2. The History of the PKK in a Nutshell**

Kurds are primarily located in the mountainous region of East and South East Anatolia, Northern Iraq and Western Iran. After the end of the Ottoman Empire the Treaty of Sevres (10 August 1920) envisaged an 'autonomous development' for the non-Turkish minorities of the Ottoman Empire. There was not a united Kurdish movement or leadership; some groups supported Mustafa Kemal in his resistance against the allied powers and the creation of a unitary state, others favored an independent Kurdish state (Kirisci and Winrow 1997). The new laizist Turkish republic did not grant special rights to the Kurdish minority and later abolished the caliphate, which had bound the Islamic Kurds to the new regime (Barkey and Fuller 1998). Rather Mustafa Kemal sought to integrate and assimilate all minorities in the new Turkish state which led to continued conflicts between the Turkish government and the Kurds.

The *Partiya Karkerên Kurdistan* (PKK, Kurdish Workers Party) took roots in 1974 and was formally established in 1978 with the goal of an independent socialist Kurdish state. It was organized like other communist parties with a politbureau and was under the strong leadership of Abdullah Öcalan. In the early 1990s the PKK grew into a mass organization. In the mid 1990s the goal of an independent Kurdish state was abandoned along with the Marxist rhetoric; instead the PKK leadership favored autonomy within a Turkish-Kurdish federation (Gunter 1997).

August 1984 marks the beginning of the PKK guerilla warfare. In 1986 the Kurdistan Peoples Liberation Army was established, and it was estimated to have 3,400 people under arms in 1987 (Gunter 1990). In August 1991, October/November 1992, and December 1994 the Turkish army carried out major operations against the PKK in Northern Iraq. March – May 1995 the Turkish army sent 35,000 troops into Northern Iraq to fight the PKK, major operations took place again in April 1996 and May 1997, when more than 50,000 troops operated in Northern Iraq. Further operations were carried out October – December 1997 and in April 1998. In February 1998 Öcalan offered the termination of armed struggle and declared ceasefire in September 1998. After the Turkish-Syrian crises in October 1998 Öcalan fled from Syria and was captured in Nairobi on 15 February 1999 and

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such as placing bombs in tourist destinations within Turkey. Besides they are listed by the German and the US governments as terrorist organizations.

later sentenced to death in Turkey. In August 1999, in captivity, he called on the PKK to end the armed struggle. At its eighth congress the PKK was succeeded by the *Freedom and Democratic Congress of Kurdistan* (KADEK) and in October 2003 by the *Kurdistan People's Congress* (Kongra-Gel). Still the armed struggle and operations against the PKK by the Turkish army continued. On 1 June 2004, the PKK called off its nearly five year ceasefire (cf. Ibrahim and Gürbey 2000, pp. 197-208); most recently in February and March 2008 the Turkish army operated again in Northern Iraq against Kurdish bases.

### 3. Data and Empirical Model

Our empirical analysis relates terrorist recruitment patterns over time to regional economic conditions. In order to identify regional recruitment patterns, we use bibliographic data on deceased fighters from the websites of the PKK's military wing and the PKK's women's branch which hail their "martyrs"; and complement it by data given in the PKK periodical *Serxwebun* and websites by families and friends of deceased fighters.<sup>8</sup> These data sources are uniquely useful for our purpose as they state not only name and year of death of PKK members, but also their place of birth and the year they joined the organization. Using the information on birthplace and year of recruitment we can construct the number of militants recruited in every year by the city of their birth, and we can relate these numbers to regional economic conditions (regional GDP and unemployment) in the year of recruitment.

As of November 2008, the bibliographic data sources contained entries for 3,110 individuals who died in action in the period of 1974 to 2008; from this we selected the individuals with complete data on the place of birth and year of recruitment. Since reports prior to 1990 were relatively few and thus are less likely to be representative, we selected 1990 as starting point for our sample. Availability of Turkish regional per capita GDP data (at provincial level) constrained the time-span to finish in 2000, which resulted in a maximal panel length of in 11 years.<sup>9</sup> Our effective sample is thus based on information on 1451 individuals recruited to the PKK between 1990 and 2000, which we use to construct a city panel of recruitment.

World-wide, there is no systematic information on living terrorists. The internet resources on the "martyrs" offer unique insights into the membership of a terror organization. In order to work with these data we have to assume that the recruitment of the listed deceased terrorists followed similar regional patterns as the overall recruitment. This is very likely as there is no a priori ground why terrorists born in a specific region should be systematically under- or overrepresented among these "martyrs". However, the sample may not be fully representative over time. Recruits from the beginning and the end of the sample period may be somewhat underrepresented: Some early recruits may not be listed because of a recollection bias whereas newer recruits are more likely to be still alive. As the median survival time in the organization is 3.7 years, and only around one fifth of the recruits survives more than 8 years, truncating the sample from above and below increases the

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<sup>8</sup>The official website of the military wing is at <http://www.hpg-online.net>; the description of the "martyrs" is at <http://www.hpg-online.net/sehit/index.html>; the women's branch website is [http://www.pajk-online.com/tr/ozgurluk\\_sehitleri/index\\_sehitler.html](http://www.pajk-online.com/tr/ozgurluk_sehitleri/index_sehitler.html). The online version of PKK's periodical publication *Serxwebun* is at <http://www.serxwebun.com/> and the website by friends and families of the deceased is at [www.sehid.com](http://www.sehid.com).

<sup>9</sup>Inquiries with the Turkish Statistical Office showed that the compilation of regional GDP has been discontinued since 2001.

representativeness of the sample (cf. Kis-Katos et al. 2008). In addition we include time dummies in all our regressions, which capture these timing effects.

In our analysis we distinguish 22 Turkish regions, 12 of which are in East and 8 in South East Anatolia (cf. Table A2 in Appendix).<sup>10</sup> The remaining two regions (Sivas in Central Anatolia and Kahramanmaraş in the Mediterranean) are regions bordering E and SE Anatolia with at least 15 recruits between 1990 and 2000. Recruitment is highly concentrated in a few South East Anatolian cities: More than half (54%) of all recruits in the sample stem from five regions only, Mardin, Diyarbakır, Şanlıurfa, Siirt, and Şırnak; Mardin alone provides around one fifth of all recruits. Other regions in Eastern Turkey are much less strongly represented: the 10 regions with smallest recruitment account for less than 20 percent of all recruits. Due to these large differences in recruitment between terrorist strongholds and the “periphery”, we conduct the analysis not only for the whole city panel, but we also investigate how recruitment patterns change when excluding “core” regions.

In constructing the city panel we identify militants by their birthplace region and construct the dependent count variable RECRUITS ( $Y_{it}$ ) as the sum of militants born in city  $i$  who joined PKK in a given year  $t$ . In doing this we have to assume that the newly recruited are influenced by the economic conditions of their birth regions.<sup>11</sup> We check the robustness of this assumption by repeating our analysis for a panel of 372 militants who joined PKK at their place of birth in Section 4.

We measure fluctuations and interregional differences in economic conditions along two main dimensions, regional per capita GDP and national unemployment. All of our regional and national economic data come from TurkStat (Turkish Statistical Institute). We construct our regional income measure, LN GDP PC. in region  $i$ , year  $t$  based on yearly regional GDP data in constant 1987 prices (in million TL), which we divide by regional population. Regional population is based on information from the 1990 and 2000 Censuses and is calculated as a linear projection for the other years.

As there are no reliable yearly regional unemployment data in Turkey, we measure fluctuations in unemployment by including the yearly average unemployment rate in Turkey (NATIONAL UNEMP).<sup>12</sup> In

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<sup>10</sup>A few of the regions have split during the 1990es; in order to improve data coverage, we collapsed these regions to their original centers. Thus, we consider the provinces of Iğdır and Ardahan together with their former center Kars (split in 1993), and Kilis with Gaziantep (split in 1996). Our results are robust to how we classify the provinces.

<sup>11</sup>We have information on the place of birth and the place of recruitment, but not on the place of residence when they decided to join the PKK. We decided for the place of birth as the relevant location rather than the place of recruitment because (1) people may move only to the place of recruitment after they have taken the decision to join only for the purpose of recruitment and (2) because they will have extended family at the place of birth (since mobility is low within E/SE Anatolia) and thus would have employment opportunities there. In our dataset we have full information on place of birth *and* place of recruitment for 1044 militants; 43% of them joined PKK at their place of birth, while other 25% joined abroad (mostly in the neighboring mountains of Syria which most likely do not represent the former place of residence of the recruits). Nevertheless, our procedure involves a measurement error for those militants who have permanently moved from their birth region if they consider alternative occupations at their new location the relevant alternative. As we do not expect these effects to be systematic, our estimates on the effects of regional differences should be unbiased but not as efficient as they would be if we had full information. Time patterns of recruitment remain unaffected by this issue.

<sup>12</sup>We also experimented with the number of registered unemployed at the end of a year which is available at city level, but found the data to be extremely volatile and the relationship between registered and actual unemployment weak: For the census years 1990 and 2000, the correlation between regional unemployment

order to control for potential scale effects in recruitment, we also include the yearly population size in all regressions, measured by the logarithm of the region’s total population. Furthermore, we include a full set of time indicators in some of the regressions in order to control for time specific shocks that influence recruitment, especially the timing of major military interventions of the Turkish army. These time effects will also capture the potential recollection bias and the truncation from above. We summarize the data that we use in the regional panel in Table 1.

*Table 1 about here*

In the subsequent empirical analysis we explain recruitment by random and fixed effects panel models for count data. As recruitment is over-dispersed (with significantly higher variance than mean, cf. Table 1 and Figure A3), we estimate the number of recruits by random and fixed effects negative binomial models. One of the main underlying reasons of this over-dispersion is that we cannot control for the non-economic reasons guiding the recruitment into the PKK: The core regions receive a significantly higher number of recruits, and show also a much higher variability in the numbers of recruits than the marginal regions, which cannot be fully explained by the local economy only. Thus we specify a negative binomial panel data model (cf. Hausman et al. 1984) as:<sup>13</sup>

$$\Pr(Y_{it} = y_{it} | X_{it}, \delta_i) = \frac{\Gamma(\lambda_{it} + y_{it})}{\Gamma(\lambda_{it})\Gamma(y_{it} + 1)} \left( \frac{1}{1 + \delta_i} \right)^{\lambda_{it}} \left( \frac{\delta_i}{1 + \delta_i} \right)^{y_{it}},$$

where the number of recruited  $y_{it}$  follows a mixture of Poisson and Gamma distributions with parameters  $(\lambda_{it}, \delta_i)$ , with  $\delta_i$  being the region specific effect,  $\lambda_{it} = \exp(X_{it}\beta)$ , and  $X_{it}$  the vector of explanatory variables. In conditional fixed effects negative binomial models, the region specific effect  $\delta_i$  defines the constant region specific dispersion (variance to mean ratio), while in random effects negative binomial models the region specific effect is allowed to vary randomly across the regions. The assumptions of the fixed effects models are less restrictive but produce less efficient estimates. All models are estimated by maximum likelihood methods. As the Hausman tests failed to reject the null hypothesis of no systematic difference between random and fixed effect estimates, we consider the random effect models as our preferred specifications.

#### 4. Results

Table 2 presents our main results for the full sample of the 22 regions, and for the sample of 18 regions which excludes four “core” regions at the Southern border of Turkey that have the highest numbers of recruited. We both report results with and without time dummies.

*Table 2 about here*

In the full sample regional GDP per capita is negatively associated with the number of terror recruits if we exclude time effects and unemployment, but loses its significance if either time dummies or

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numbers and the numbers of registered unemployed in the selected regions amounted to 0.46, and the ratio of registered to total unemployed varied from 8.2% to 136%.

<sup>13</sup> Tests of the negative binomial model against the Poisson model showed strong evidence in favor of the binomial specifications.

unemployment is included. In part this is due to the negative correlation of unemployment and GDP per capita and the time variable component in GDP p.c. so that time effects and unemployment may capture part of the influence of GDP p.c. The unemployment rate exerts a strongly significant positive effect on recruitment numbers in all specifications. Our results clearly show that recruitment does depend on the state of the economy and that recruitment decisions are influenced by economic considerations. The strong geographical concentration of recruits on some “core regions” however also demonstrates that the economy alone cannot explain recruitment decisions – otherwise recruitment numbers would have been distributed more evenly. In a related vein, we do not find any scale effect in the sense that more populous regions provide more PKK recruits.

The strong geographical concentration of recruits raises the question whether recruitment in the periphery follows a different logic than recruitment in the center. In order to study this issue we excluded the four core regions from the sample. It turns out that GDP per capita now exerts a significantly negative effect even in the regression model with unemployment and time effects. Unemployment remains highly significant positive (model 7 and 8 in Table 2). To study this issue further we ran regressions on an increasing sample of regions beginning with the seven regions with the lowest recruitment numbers (the “hinterland”) and consecutively adding regions with increasing numbers of recruits. The impact on the estimates for the two main variables of interest – unemployment and GDP per capita – are depicted in Figures 1 and 2.

*Figure 1 and Figure 2 about here*

There is only a slight decrease in the parameter value for unemployment as we include the center regions, indicating that unemployment exerts an effect independent of the region. In contrast, the estimated effect of GDP per capita goes down sharply as we include successively the six core regions. It becomes insignificant for the sample of 20 regions excluding the two regions with the highest recruitment numbers. This seems to indicate that the effect of economic variables differs partly between terrorist strongholds and their hinterland.

We have used the birthplace as the defining location for GDP per capita, arguing that the economic conditions in this location are relevant for the decision to join as people may have moved to the location of recruitment only for that purpose (e.g. to abroad in Syria or Iraq, cf. fn. 11). Still this might not be true for all recruits. Therefore we ran a robustness check by using only those individuals that were recruited where they were born. This reduced the number of individuals in our sample to 372. Results from these regressions are reported in Table 3.

*Table 3 about here*

National unemployment affects recruitment still very significantly positively and the pattern for GDP per capita is similar to the pattern of the full sample of individuals. It is insignificant for the full sample of regions and becomes significant at the ten percent level, if we exclude the four core regions.

## **5. Discussion**

We used a unique data set on Kurdish militants that allowed us to study the determinants of recruitments for Kurdish militants. To our knowledge it is the only existing data set which contains

information on terrorist recruitment at a large scale. Applying a panel estimator we find that the number of recruitments go up in times and places with high unemployment and, for non-core regions, with low per capita GDP. In other words, a bad economy contributes to the making of terrorists!

There are various potential reasons why we find a relationship between economic conditions and terrorism where many others have failed to find such a connection in related contexts. First, we look at recruitment decisions, not at acts of violence or terrorism. While the individual decision to *join* a terrorist group seems to be influenced by economic conditions, the collective decision of the terrorist group to carry out *acts* of terrorism may not. Terror acts may depend on opportunity, the selection of an appropriate target, and necessary preparation. Their timing may be influenced also by political considerations, for instance the goal to maximize media attention or to influence politics or election outcomes. Second, empirical findings may be very context-specific; systematic evidence on the nature of terrorists is still very scarce and it is not clear whether results generated for Hezbollah or Hamas would carry over to Kurdish PKK fighters or Basque terrorists. Secular terrorist groups may function differently than extremist religious ones. In particular, poor economic conditions increases the supply of potential terror recruits; yet whether this will lead to increased recruitment depends on the recruitment strategy of terror organizations. If they have a fixed recruitment target (and an effective screening) it will lead to higher average quality of terrorists; if they have minimum quality requirements (which could be zero) it will lead to higher recruitment. Third, it is empirically very difficult to establish or refute a relationship between terrorist activity and economic conditions. Cross-country comparisons that try to do so are stricken with problems of unobservable heterogeneity that make causal inferences difficult. The reaction to changing economic conditions may differ between countries so that in the aggregate a clear effect may not be isolated. Our data uses *interregional* (and over time) comparisons. Thus the regulatory and institutional framework is the same and peoples' reactions to changing economic conditions may be much more similar than those of members of different societies and cultures.

We have conducted the first econometric analysis on terrorist recruitment and hope to have contributed to the understanding of terrorism. Yet, the nature of the beast is still far from being clear. For instance it is unclear to what extent our findings carry over to other places, such as the Gaza strip or the Basque region. Also we do not know what exactly causes the positive (negative) association of unemployment (GDP per capita) and terrorist recruitment. Moreover we observe a strong concentration of recruitment in a subset of Kurdish-inhabited areas, which is not linked to economic factors. This observation points to the importance of additional, non-economic factors for recruitment decisions, which remain to be understood. These questions establish a fascinating field for future research, which in our view needs to transgress the boundaries of economics.

Our tentative policy conclusion is that improving the economy will reduce recruitment into terror organizations, especially by draining the swamp of supporters in the periphery; but it will not be sufficiently reduce recruitment in the core regions of the terrorists.

## Appendix

### Figure A1 Regional Map of Eastern Turkey

**Note:** Regions of East Anatolia in the dataset are depicted in pale blue, of South East Anatolia in red, neighboring regions in yellow.

**Source:** Blank map based on Wikimedia Commons (Atilim Gunes Baydin © GFDL)

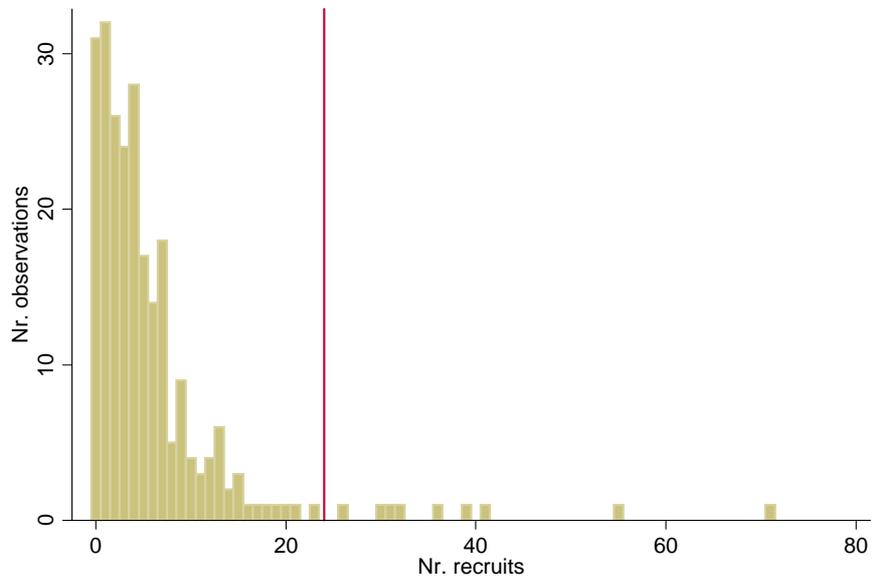
### Figure A2 Kurdish inhabited area by the CIA (1992)

**Note:** Based on this map, Ardahan, Igdir, Malatya, Gaziantep, Kilis, Sivas and Kahranmaras were classified as not primarily Kurdish areas.

**Source:** Perry-Castañeda Library Map Collection at The University of Texas at Austin, [http://www.lib.utexas.edu/maps/middle\\_east\\_and\\_asia/kurdish\\_lands\\_92.jpg](http://www.lib.utexas.edu/maps/middle_east_and_asia/kurdish_lands_92.jpg)

**Figure A3**

Distribution of numbers of recruited per year and region



**Note:** Observations with numbers above the red line all come from two core regions only, Mardin and Diyarbakır.

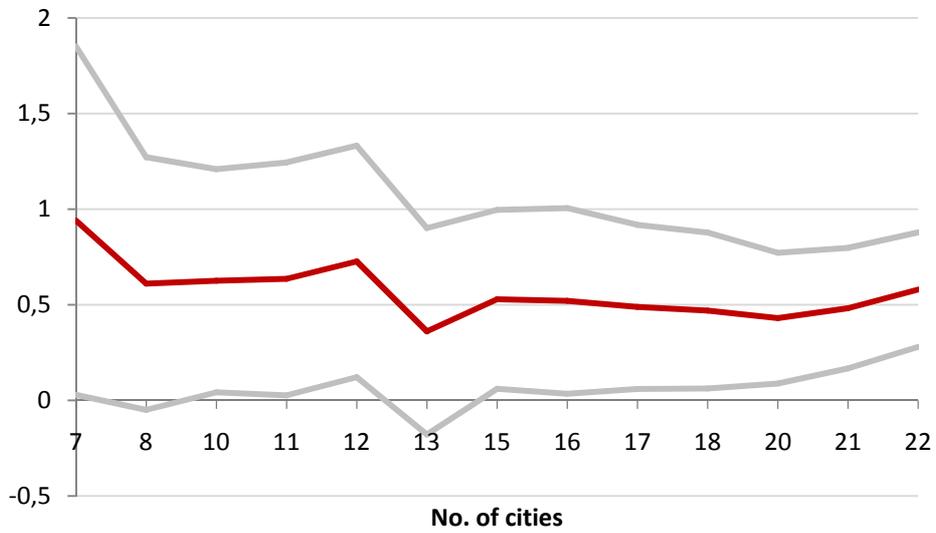
**Figure A4**

Total yearly recruitment and national unemployment



**Figure 1**

Turkish unemployment  
Estimated coefficients and 90% confidence intervals



**Note:** Coefficient estimates are based on negative binomial regressions of the number of recruits on all explanatory variables as reported in columns (6) and (8) of Table 2, including a full set of time dummies. Cities are ordered based on the total number of recruits over the period 1990 to 2000.

**Figure 2**

Regional GDP pc.  
Estimated coefficients and 90% confidence intervals



**Note:** Coefficient estimates are based on negative binomial regressions of the number of recruits on all explanatory variables as reported in columns (6) and (8) of Table 2, including a full set of time dummies. Cities are ordered based on the total number of recruits over the period 1990 to 2000.

**Table 1: Descriptive Statistics**

<i>Variable name</i>	<i>Description</i>	<i>Mean</i>	<i>S.dev.</i>	<i>Min</i>	<i>Max</i>
NR. RECRUITED	Number of militants born in a given city who joined PKK within a given year	6.02	8.47	0	71
NR. RECRUITED REDUCED	Number of militants born in a given city who joined PKK within a given year of whom we know that they joined at their birthplace	1.36	3.50	0	28
LN GDP PC.	Natural logarithm of real GDP per capita (in constant 1987 prices) at the city level (in million TL)	13.35	0.47	12.37	14.15
NATIONAL UNEMP.	Yearly average Turkish unemployment in %.	7.67	0.84	6.5	9.0
LN POPULATION	Log of population	13.15	0.63	11.3	15.3

**Note:** Descriptive statistics refer to N=239 observations.

**Table 2. Random effects negative binomial panel regressions for the panel based on all recruits (1990-2000)**

Dependent variable	RECRUITS							
	FULL SAMPLE				EXCLUDING „CORE“			
Sample	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory var.	RE	RE	RE	RE	RE	RE	RE	RE
LN POPULATION	0.127 (0.201)	0.098 (0.209)	0.231 (0.231)	0.202 (0.253)	0.161 (0.239)	0.202 (0.253)	-0.119 (0.195)	-0.218 (0.192)
LN REGIONAL GDP PC.	-0.609* (0.271)		-0.379 (0.289)	-0.137 (0.292)		-0.137 (0.292)	-0.550* (0.217)	-0.451† (0.217)
NATIONAL UNEMP.		0.443** (0.054)	0.436** (0.054)		0.579** (0.182)	0.580** (0.182)	0.366** (0.064)	0.470** (0.248)
Time fixed effects	<i>No</i>	<i>No</i>	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>No</i>	<i>Yes</i>
No. observations	239	239	239	239	239	239	196	196
No. regions	22	22	22	22	22	22	18	18
Hausman test p-value	0.782	0.427	0.593	0.999	0.999	0.999	0.262	0.990

**Note:** The models are estimated by ML using `xtnbreg` (Stata®). Standard errors are reported in parentheses, significance levels are denoted by \*\*p<0.01, \*p<0.05, †p<0.10. In all cases, the Hausman test fails to reject the null hypothesis that the differences between the fixed and random effects models are not systematic.

**Table 3. Random effects negative binomial panel regressions for recruits who joined at their birthplace (1990-2000)**

Dependent variable	RECRUITS		
	FULL SAMPLE		WITHOUT CORE
Sample	(1)	(2)	(3)
Explanatory var.	RE	RE	RE
LN POPULATION	0.191 (0.359)	0.597 (0.462)	-0.468 (0.291)
LN REGIONAL GDP PC.	0.151 (0.629)	0.002 (0.663)	-0.625+ (0.375)
NATIONAL UNEMP.	0.849** (0.117)	1.371** (0.414)	0.820** (0.183)
Time fixed effects	<i>No</i>	<i>Yes</i>	<i>No</i>
No. observations	239	239	196
No. regions	22	22	18
Hausman test p-value	0.530	0.999	0.927

**Note:** The models are estimated by ML using `xtnbreg` (Stata®). Standard errors are reported in parentheses, significance levels are denoted by \*\*p<0.01, \*p<0.05, †p<0.10. In all cases, the Hausman test fails to reject the null hypothesis that the differences between the fixed and random effects models are not systematic.

**Table A1. Number of new recruits by region of birth**

City	Province	Nr. of recruits				Reduced sample
		1990-2000	Share	1990-1994	1995-2000	
Mardin	South East Anatolia	285	19.6%	209	76	108
Diyarbakır	South East Anatolia	221	15.2%	136	85	95
Şanlıurfa	South East Anatolia	94	6.5%	57	37	31
Siirt	South East Anatolia	94	6.5%	64	30	17
Şırnak	South East Anatolia	83	5.7%	46	37	24
Muş	East Anatolia	64	4.4%	33	31	6
Tunceli	East Anatolia	62	4.3%	34	28	14
Bitlis	East Anatolia	58	4.0%	34	24	15
Elazığ	East Anatolia	58	4.0%	44	14	0
Van	East Anatolia	52	3.6%	12	40	12
Batman	South East Anatolia	50	3.4%	30	20	10
Hakkari	East Anatolia	47	3.2%	29	18	10
Bingöl	East Anatolia	44	3.0%	28	16	5
Kars (incl. Iğdır, Ardahan)	East Anatolia	44	3.0%	28	16	5
Kahramanmaraş	Mediterranean	42	2.9%	20	22	6
Erzurum	East Anatolia	41	2.8%	28	13	7
Ağrı	East Anatolia	37	2.5%	26	11	2
Adıyaman	South East Anatolia	18	1.2%	9	9	3
Erzincan	East Anatolia	17	1.2%	6	11	0
Malatya	East Anatolia	17	1.2%	7	10	0
Sivas	Central Anatolia	17	1.2%	13	4	0
Gaziantep (incl. Kilis)	South East Anatolia	6	0.4%	2	4	2
<b>TOTAL</b>		<b>1451</b>	<b>100.0%</b>	<b>895</b>	<b>556</b>	<b>372</b>

**Note:** The reduced sample refers to those recruits who joined at their birthplace.

## Table A2. Data Sources and Definitions

<b>Recruited:</b>	Number of recruited per region in a given year is generated based on bibliographic sources on deceased PKK fighters. Fighters are identified by their birthplace, or in few cases by their place of origin. Sources for bibliographic data: <a href="http://www.hpg-online.net/sehit/index.html">http://www.hpg-online.net/sehit/index.html</a> , <a href="http://www.pajk-online.com/tr/ozgurluk_sehitleri/index_sehitler.html">http://www.pajk-online.com/tr/ozgurluk_sehitleri/index_sehitler.html</a> , <a href="http://www.serxwebun.com/">http://www.serxwebun.com/</a> , <a href="http://www.sehid.com">www.sehid.com</a> .
<b>National Unemployment:</b>	It refers to the share of unemployed as percentage of civilian (non-military) labor force. Collected semi-annually by TurkStat via a Household Labor Survey; annual figures are averages of the semi-annual ones.
<b>Regional pc. GDP (real):</b>	Yearly regional GDP has been collected by TurkStat, and is expressed in constant 1987 Turkish Lira. Per capita values are calculated by dividing by regional population.
<b>Regional population:</b>	Regional population figures are based on the 1990 and 2000 Census, and calculated as a linear projection for the years between 1990 and 2000.

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