

Berna Burçak Başbuğ

The Mandatory Earthquake Insurance
Scheme in Turkey

Middle East Technical University

The World Bank Institute

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OUTLINE

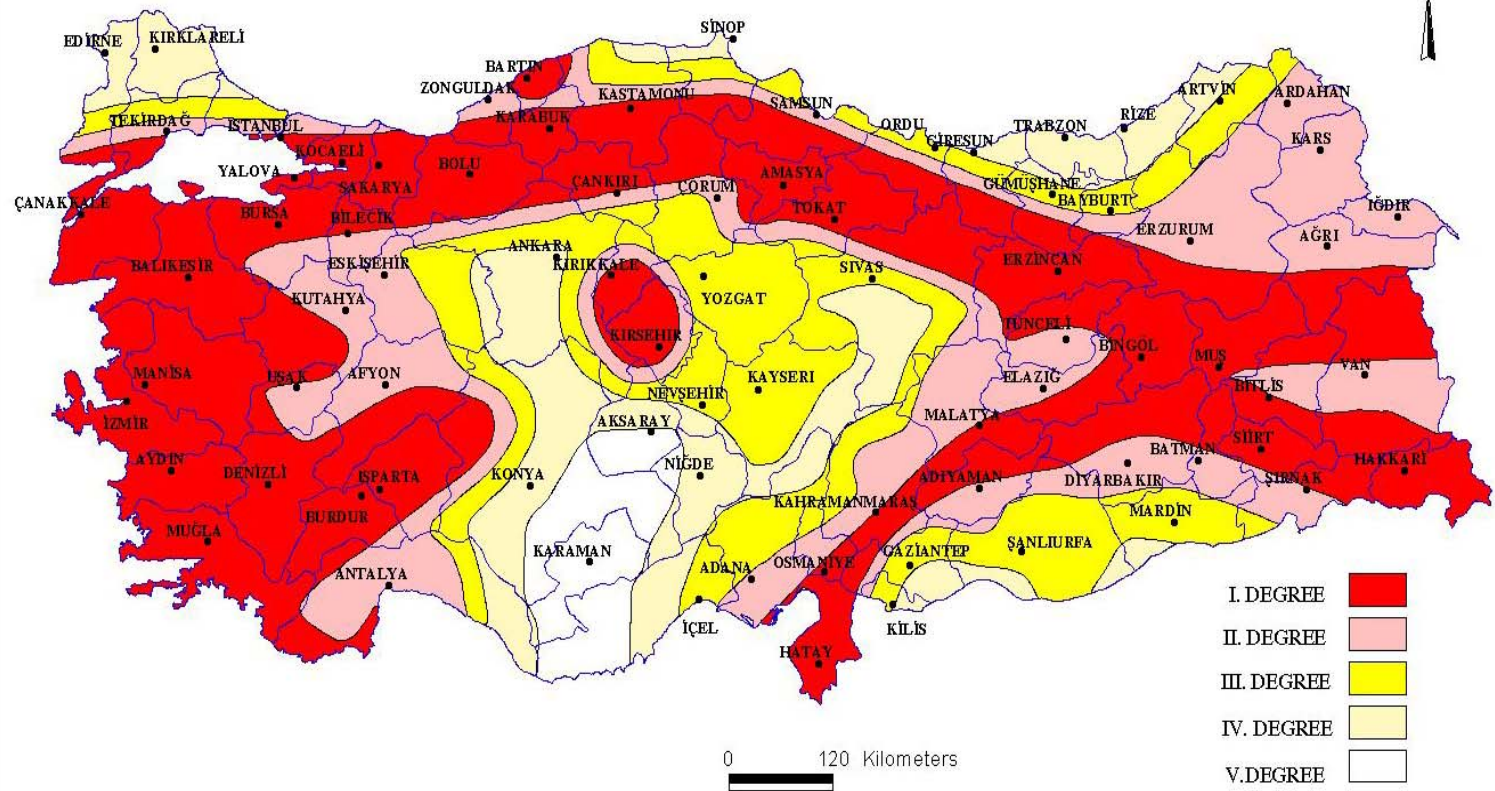
- The country profile of Turkey
 - Natural Disasters in Turkey
- The Turkish Catastrophe Insurance Pool (TCIP)
 - The use of Statistics with TCIP data

The country profile of Turkey

- Total area: 780,580 km²
- Total population: 70, 413, 958 (July 2006 estimate)
- GDP purchasing power parity: USD 572b (2005 estimate)
- GDP per capita: 8, 200 USD (2005 estimate)
- Unemployment rate: 10.2 % (plus underemployment of 4.0 %) (2005 estimate)

- Turkey is one of the most earthquake-prone countries in the World.
- 111 significant earthquakes in the 20th century with 99,391 fatalities (U.S Geological Survey)
- 96 % of the total population, 96 % of the total land, 90 % of the cities are situated near to active fault lines.
- Landslides, floods, rock falls, avalanches are some other types of disasters to occur in Turkey.

OFFICIAL EARTHQUAKE HAZARD MAP of TURKEY*



0 120 Kilometers

- I. DEGREE
- II. DEGREE
- III. DEGREE
- IV. DEGREE
- V. DEGREE

Province Center ●

Province Boundary —

After Özmen et al., 1997

*T.C. Ministry of Public Works and Settlement, 1996

GENERAL DIRECTORATE of DISASTER AFFAIRS
EARTHQUAKE RESEARCH DEPARTMENT
ANKARA-TÜRKİYE

- Top-down Disaster Risk Management.

- Centralised system - the government is the main body in disaster mitigation/response strategies.

- Financial mechanisms available to help to cover the economic losses due to disasters: e.g. contingent credit, reserve fund, catastrophe bonds, micro finance/micro insurance.

- **Insurance:** One of the financial systems to cope with the effects of the disasters.

- 1999 earthquakes triggered the initialisation / application of the mandatory earthquake insurance system in Turkey.

TCIP

- In application since 27/September/2000.
- First public-private insurance system in the World.
- Modelled on the California Earthquake Authority and the New Zealand Earthquake Commission.
- Covers the losses caused by: earthquake itself, fires-explosions and landslides following the earthquake.
 - Only insures the residential buildings within the municipality borders. No insurance is offered for rural areas, business promises or the building contents.

- Contract period: 1-year.
- In 2006, approximately 2.5 million policies.
- Penetration rate: 16.51 % (01/02/2005 figures of Milli Re)
 - Total payment capacity in 2005 is more than EUR 1.1b (~ USD 1.33b).
 - Aims to pay back the claims maximum in 1-month.

- 15 tariffs apply:

5 different risk zones * 3 building types (masonry, reinforced concrete, other types).

- Reinsures its risk to A-level or higher-rated international reinsurance companies:

- November 2003-November 2004: USD 740m
- November 2004-November 2005: USD 750m
- November 2005-November 2006: USD 920m

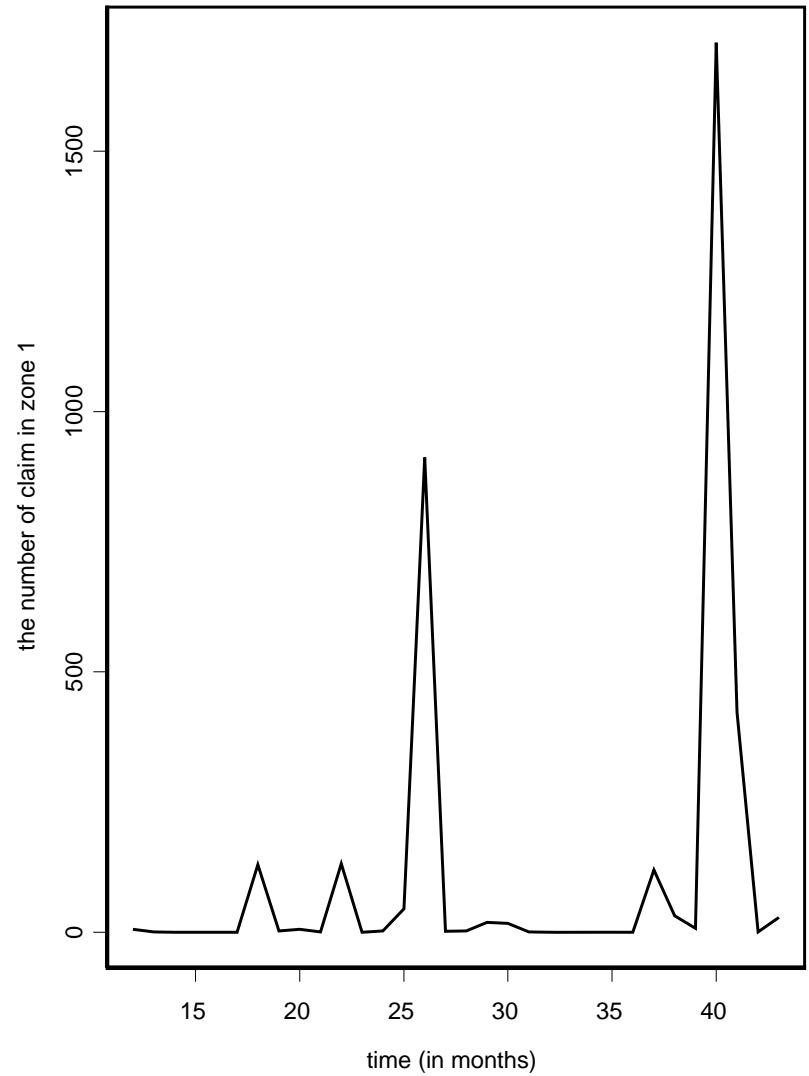
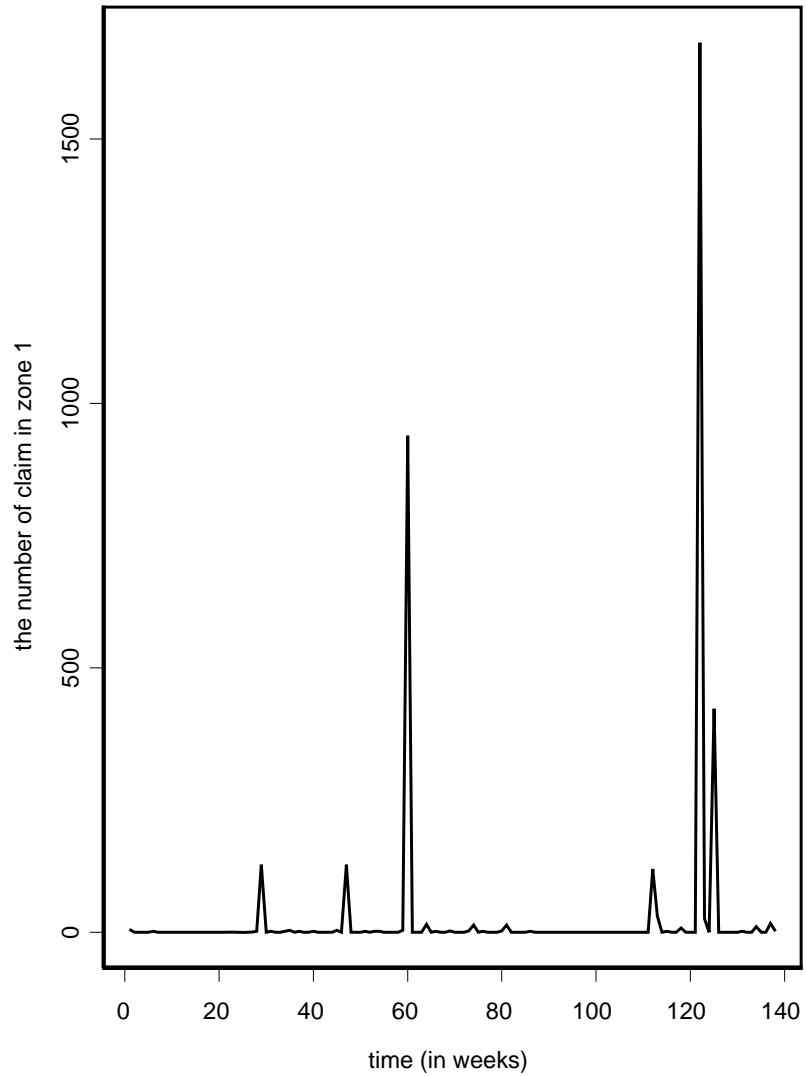
- TCIP paid approx. 15,310,663.36 YTL between 2000-2006 for 8,066 claims of 131 earthquakes.

- Improvements are needed: needs to be available for all parts of the community (rural, urban).
- is planned to be included in the gas, telephone, water bills to really make it “compulsory”.
- Insurance culture is not very common in Turkey. Still way to go.
- Sadly, another big earthquake experience will show how efficient the system is.

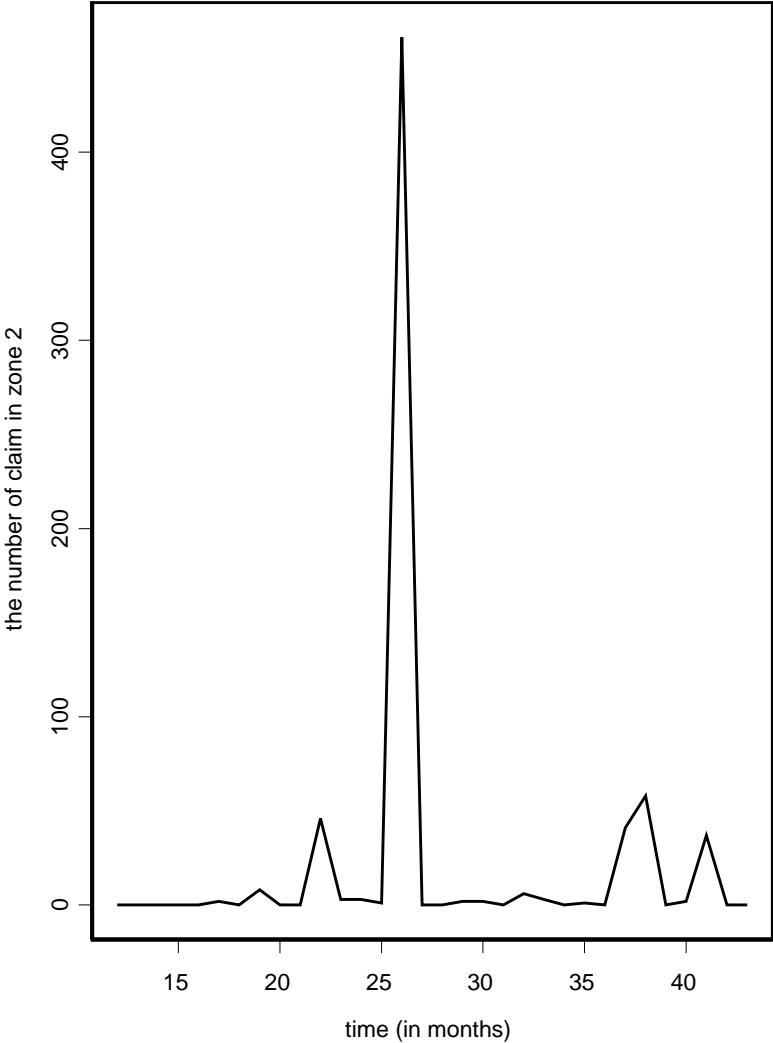
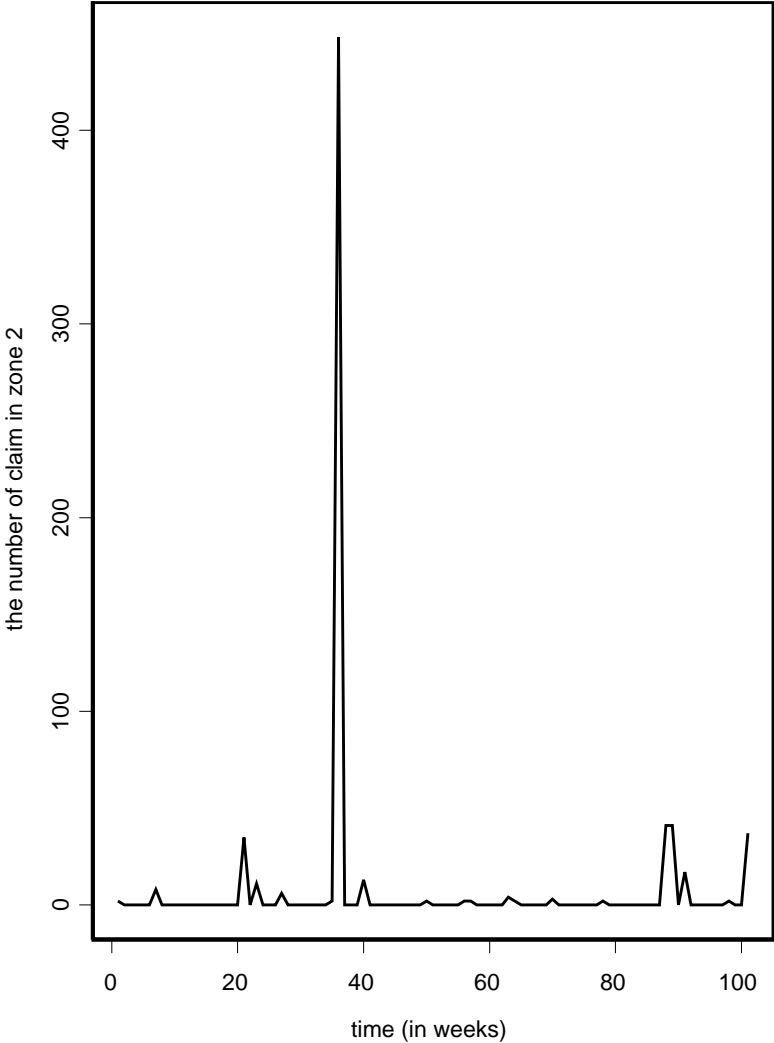
How Statistics work with earthquake claims data?

- Analysis conducted with TCIP claims data from December 2000 until July 2003 (Source: Milli Re)
 - The number of claims and the claim amount are of interest
 - TCIP reserve estimation can be made by using Generalised Linear Models (GLM) with time-dependent kernel function to represent the jump pattern of the whole process

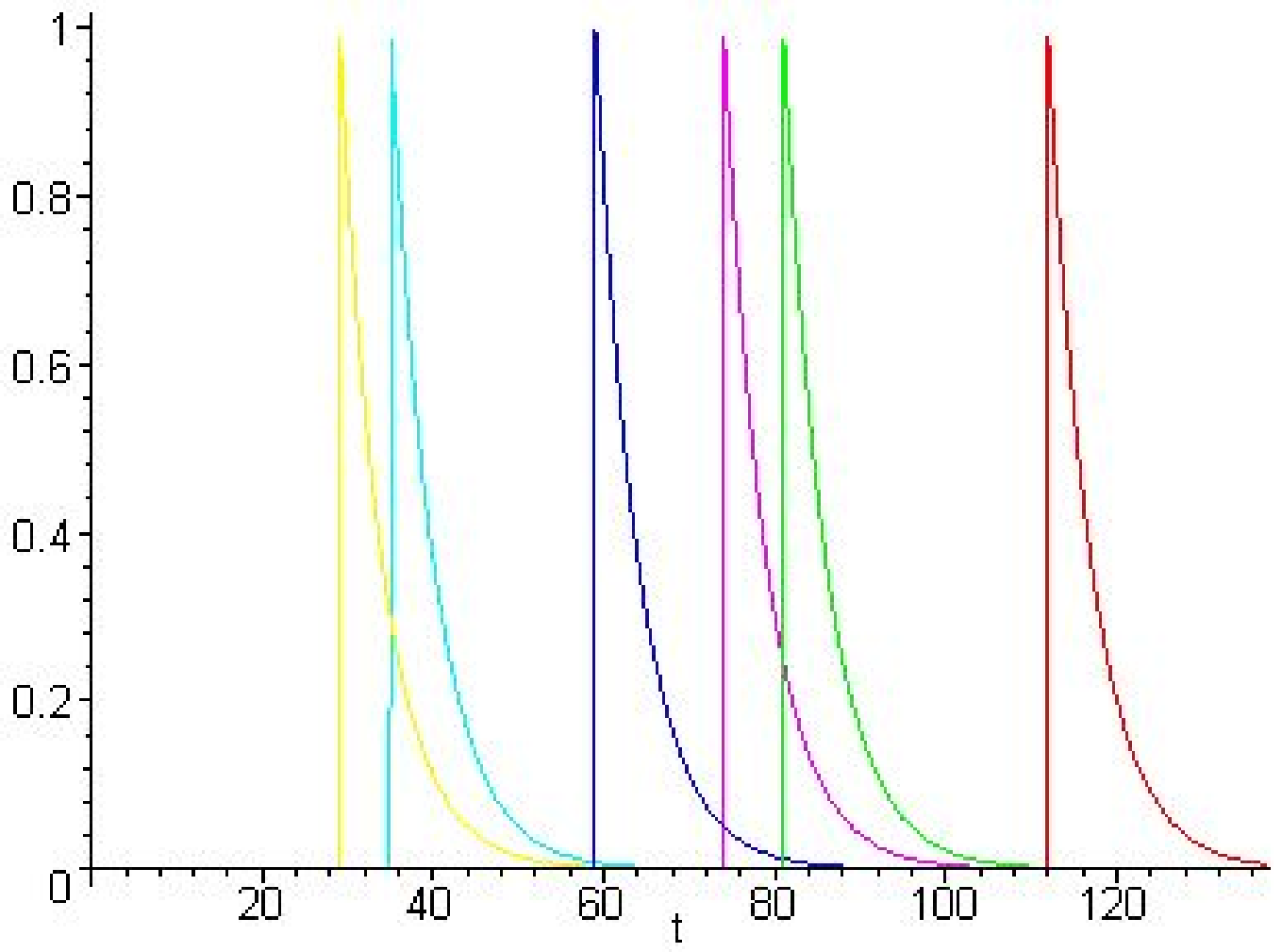
The number of claims data versus time in risk zone 1 in Turkey



The number of claims data versus time in risk zone 2 in Turkey



An example plot to represent the jumps by empirical kernels at significant earthquakes



- The data modelled in S-Plus by GLM for zone 1 and zone 2 .
- The magnitude and the residential building no. of the earthquake area (obtained from Turkish Statistical Institute) are used in the models as covariates.
- Some scenarios are generated for zone 1 and zone 2 basis (unpublished work).
- The aggregate mean (the expected total claim amount), which suggests the adequacy of the TCIP reserves, can be estimated by using the claim number and claim amount models.

Suggestions:

- TCIP needs improvements to increase its capacity.
- Premium calculations for different risk zones should be revised carefully.
- Spread the insurance to all parts of country. Many people do not buy the contract again, if there is no earthquake strike in their contract period.
- Develop a sustainable National Disaster Risk Management Program, of which TCIP plays an important part.



Thank you all for your interest and participation.