"Mapping crime and insecurity in the city of Athens during the economic crisis and beyond"

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Theoretical framework

- The relationship between economic factors and crime has been a matter of debate for criminologists since the 19th century.

- The relationship between economic factors and crime has been empirically investigated at a micro, meso and micro of analysis (Zarafonitou, 2004).

- Many macro economic factors such as unemployment, Gross State Product (GSP), income inequality, Gross Domestic Product (GDP), real income, Consumer sentiment index etc. are taken into account in order to investigate the relationship between the economic situation and crime (Raphael & Winter-Ebmer, 2001· Goldman,1977·Rosenfeld & Fornago, 2007·Rosenfeld & Messner, 2009·Arvanites & Defina, 2006).

- The relationship between macro economic factors and crime may vary according to different parameters such as: type of crime, time period explored, geographical unit of analysis, type of data sources, methods of statistical analysis, variables considered etc. (UNODC, 2011:9).

- The unit of geographical analysis is of great importance→ Contemporary models of mapping and spatial analysis of crime in combination with a series of factors may highlight the peculiarities of crime in a given space and time and show more clearly the associations under examination especially at the micro level of neighborhood in the urban context (Zarafonitou, 2004).
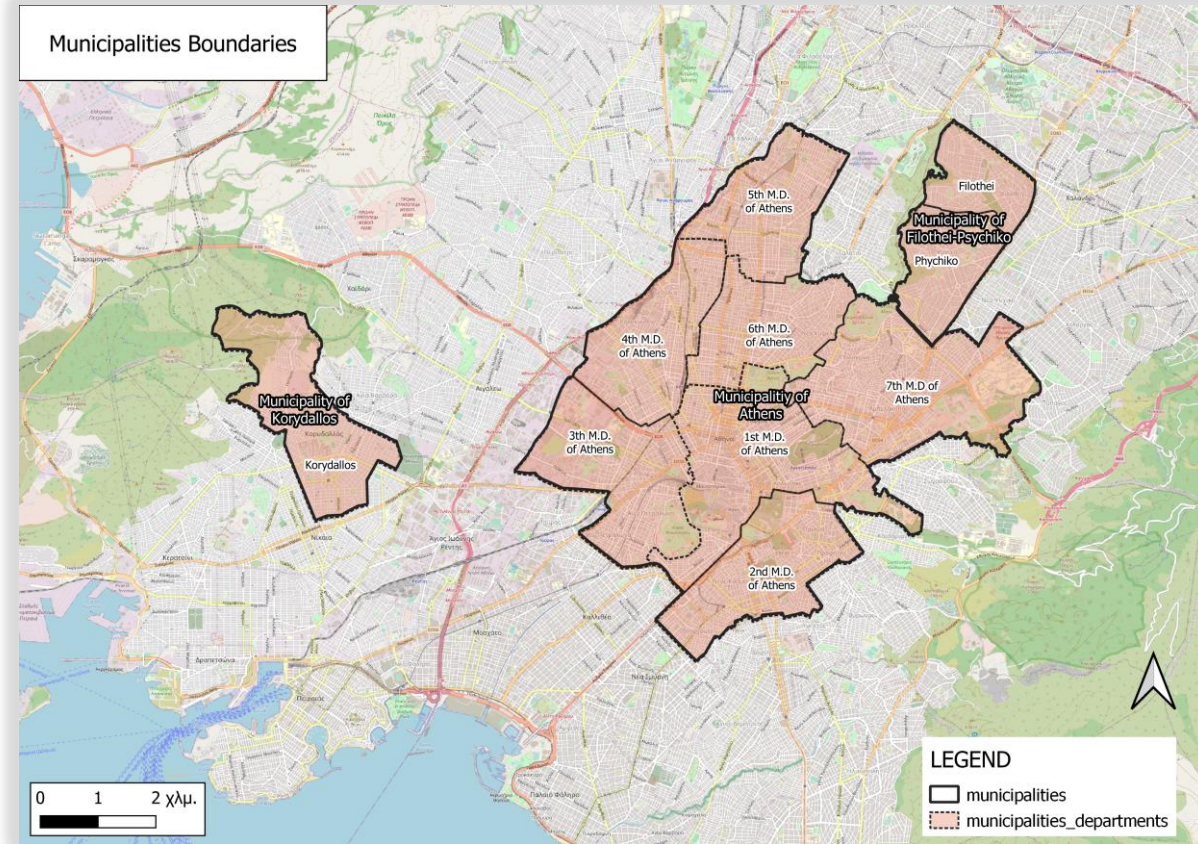
Theoretical framework

- Empirical studies show a relationship between factors such as the unemployment, economic insecurity, economic inequality, absence of social welfare measures, poverty or low socioeconomic status and fear of crime (Britto, 2013· Will & McGrath, 1995·Dammert & Malone, 2003·Pantazis, 2000).

- Fear of crime is "*a rational or irrational state of alarm or anxiety engendered by the belief that one is in danger of criminal victimisation*" (McLaughlin & Muncie, 2006:164).

- Fear of crime is at some degree independent of crime and victimisation rates (Garland, 2001:122· Zarafonitou, 2014:278).

- Factors related to fear of crime: individual characteristics, vulnerability of the subject, trust in the police and the criminal justice system, sources of information regarding crime, subjective risk perception, type and seriousness of crimes, experience of previous victimisation, social and environmental features of the spatial setting (Box, Hale, Andrews, 1988· Zarafonitou, 2002,2009· Killias, 1990).

- There is no equal distribution of fear crime in the urban context and there is a strong relationship between fear of crime and deprived urban areas with intense signs of social and environmental degradation (Hideg & Manchin, 2005· Lewis & Salem, 1986· Zarafonitou, 2011).

The study

❑Our study conducted in the framework of the project "***Spatial aspects of Crime and insecurity in the era of economic crisis: Trends, dimensions and correlations***" **Project (funded by the Hellenic Foundation for Research and Innovation under the scientific responsibility of Prof. Christina Zarafonitou),** aims to examine the evolution of crime and fear of crime during the period of the economic crisis and beyond in Greece and especially in the region of Athens.

❑***Financial crisis*** refers to a situation in which "*the economy is characterized by a continual and noticeable reduction of the economic activity*" (Koufaris, 2010).

❑The Greek financial crisis (debt crisis) begun in 2009. In 2018 the 3rd bailout package expired and in 2019 capital controls were removed.

❑During the economic crisis there was a reduction of financial liquidity and business activity, an increase of unemployment and economic sectors related to housing construction, tourism, small–medium enterprises, and the shipping industry were hard-hit (Pagoulatos & Triantopoulos, 2009).
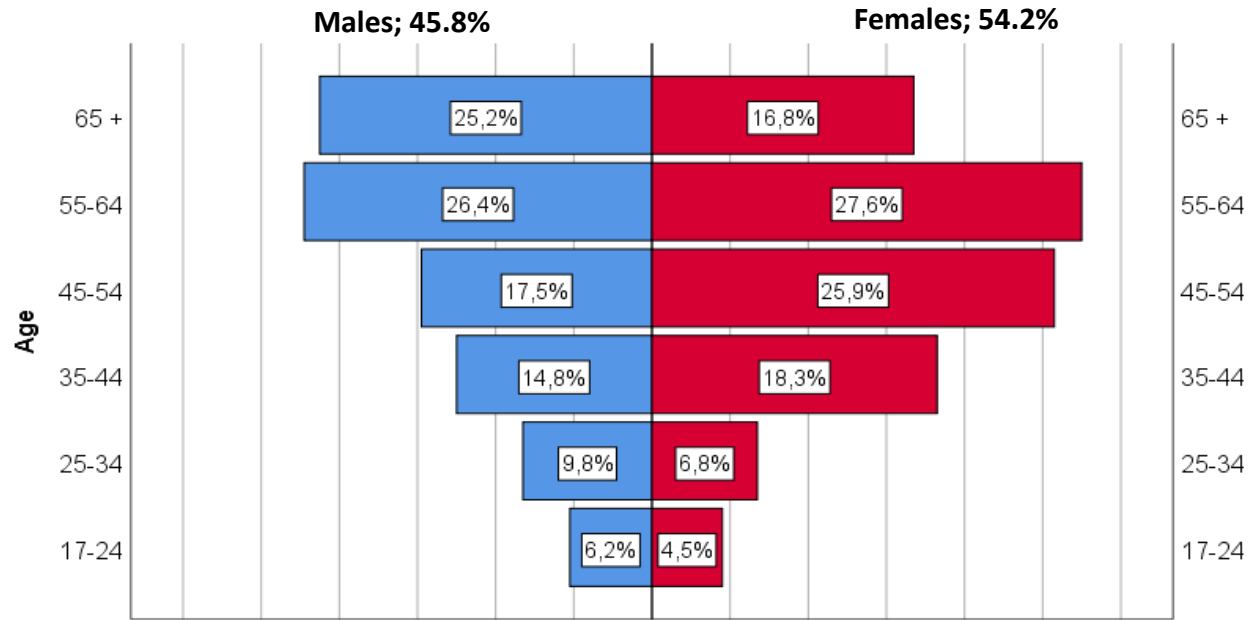
Methodology of the research

- **Sampling stage**. The proposed sampling design was that of the multidimensional stratified sampling from a sampling population defined on the basis of the population census of Hellenic Statistical Authority for the year of 2011.

- The sampling, was designed at a **household level** using 3 main strata and 7 secondary substrata
    - 736 filled questionnaires, 525 from residents of Athens Municipality, 71 from Korydalos Municipality, 150 from Filothei - Psychiko Municipality.

- **Data collection stage**. A self reported survey was conducted through interviews via Computer Assisted Telephone Interviewing (CATI) with the use of a questionnaire.

- **Statistical and Cartographic Analysis**. The results were transformed into an SPSS dataset and analyzed with descriptive and inferential statistics. Cartographic visualization and spatial analysis of the results was made in QGIS and R.
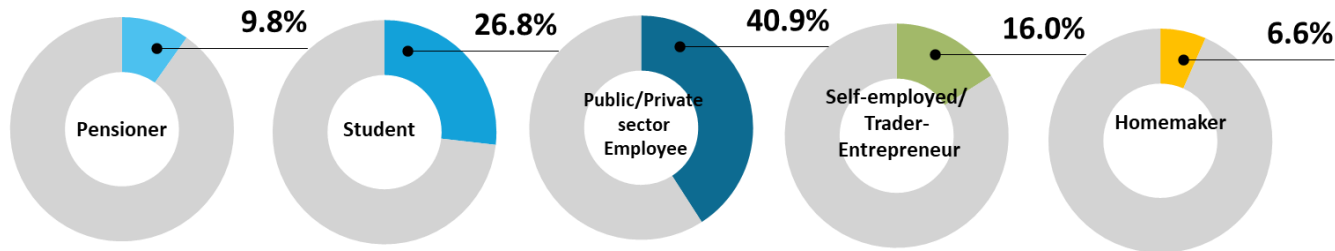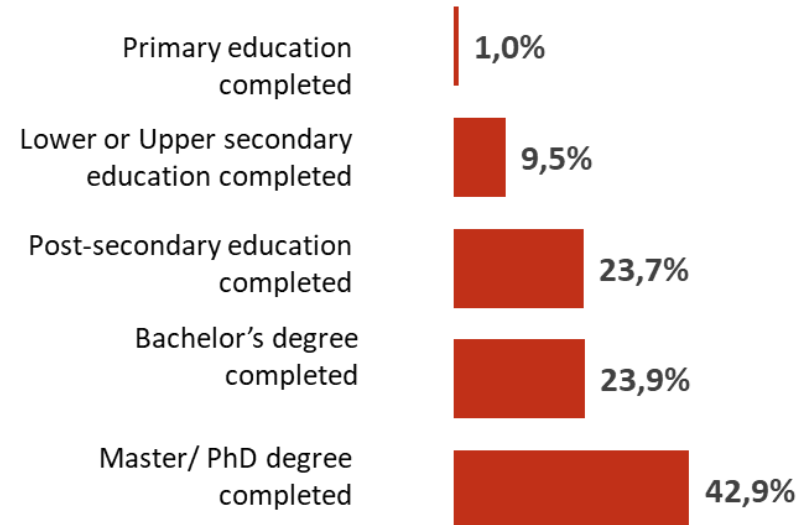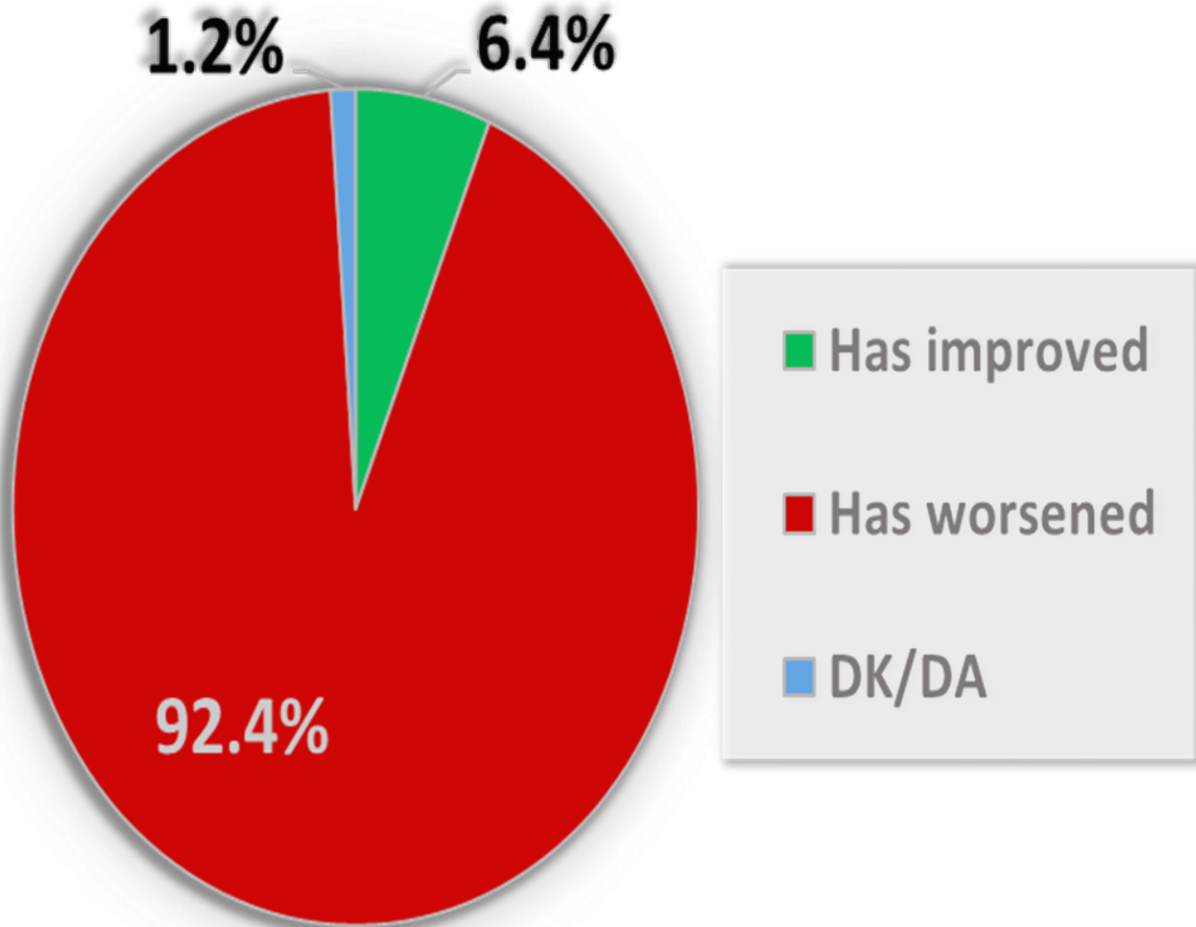
Sample characteristics:

Gender/Age

Males; 45.8% **Females; 54.2%**

Age	Males	Females
65 +	25,2%	16,8%
55-64	26,4%	27,6%
45-54	17,5%	25,9%
35-44	14,8%	18,3%
25-34	9,8%	6,8%
17-24	6,2%	4,5%

Marital status

24.5%
Single
(living alone)

65.7%
Married or domestic
partnership
(living with someone)

9.7%
Divorced/ Separated/
Widowed
(living alone)

Employment Status

9.8% Pensioner

26.8% Student

40.9% Public/Private sector Employee

16.0% Self-employed/ Trader-Entrepreneur

6.6% Homemaker

Educational level

Primary education completed	1,0%
Lower or Upper secondary education completed	9,5%
Post-secondary education completed	23,7%
Bachelor's degree completed	23,9%
Master/ PhD degree completed	42,9%

Your household's financial situation has improved or has worsened since the economic crisis?

- 1.2%
- 6.4%
- 92.4%

Legend:
- ■ Has improved
- ■ Has worsened
- ■ DK/DA

In which areas did the economic crisis affect your household?

- Family income decreased; 18.9%
- Savings of family members decreased; 18.3%
- Spending on entertainment decreased; 17.3%
- Reduced heating costs; 12.4%
- Spending on food decreased; 10.5%
- Medical care expenses were reduced; 8.4%
- Spending on education has been reduced; 7.5%
- All of your household bills (electricity, telephone, water, etc.) could not be paid; 6.8%
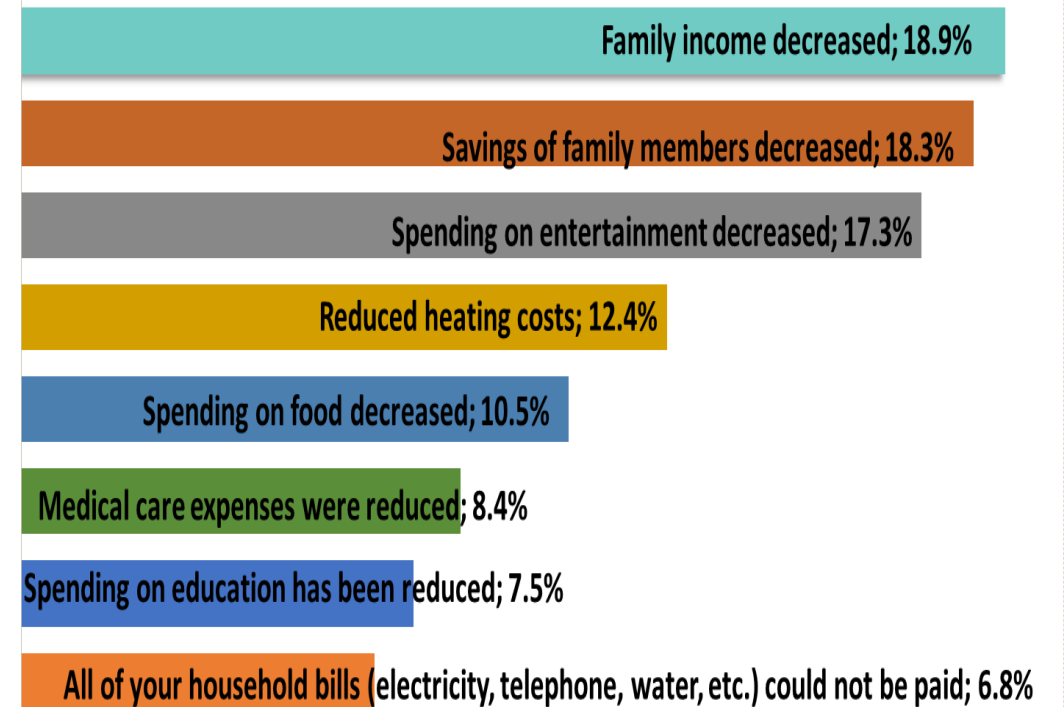
Crime level evolution
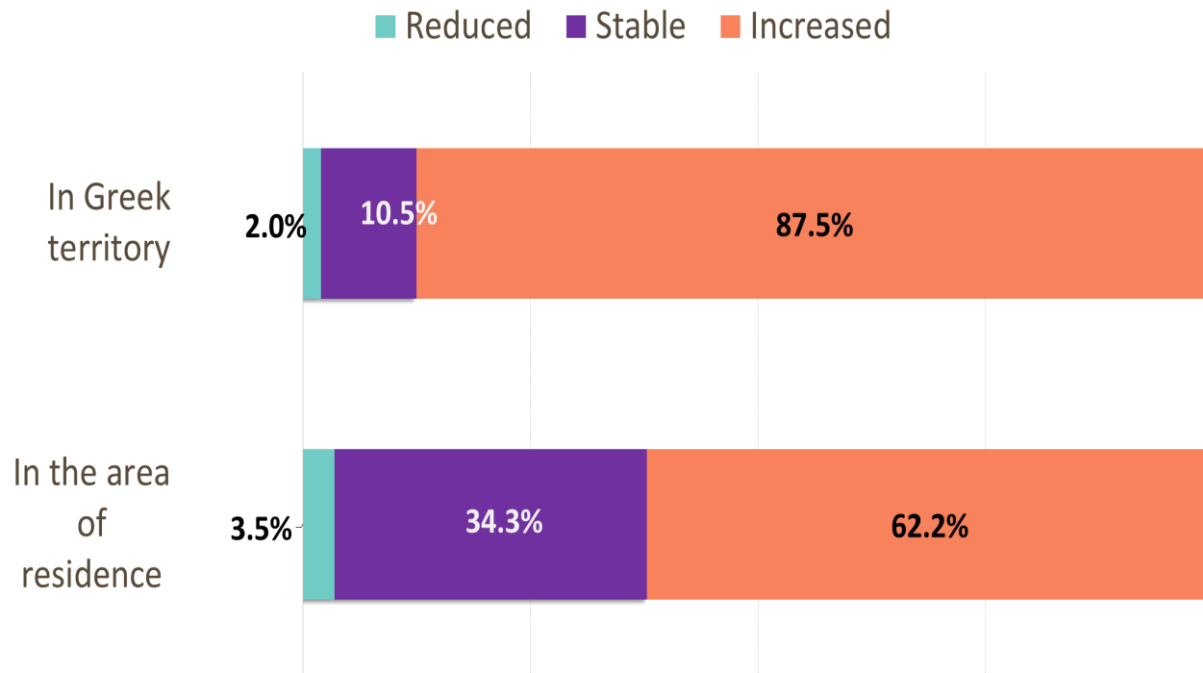
How safe do you feel walking alone in your area of residence after dark?

Reduced | Stable | Increased

In Greek territory: 2.0% | 10.5% | 87.5%

In the area of residence: 3.5% | 34.3% | 62.2%

Very safe; 21.2%
Fairly safe; 43.1%
Safe (66.2%)
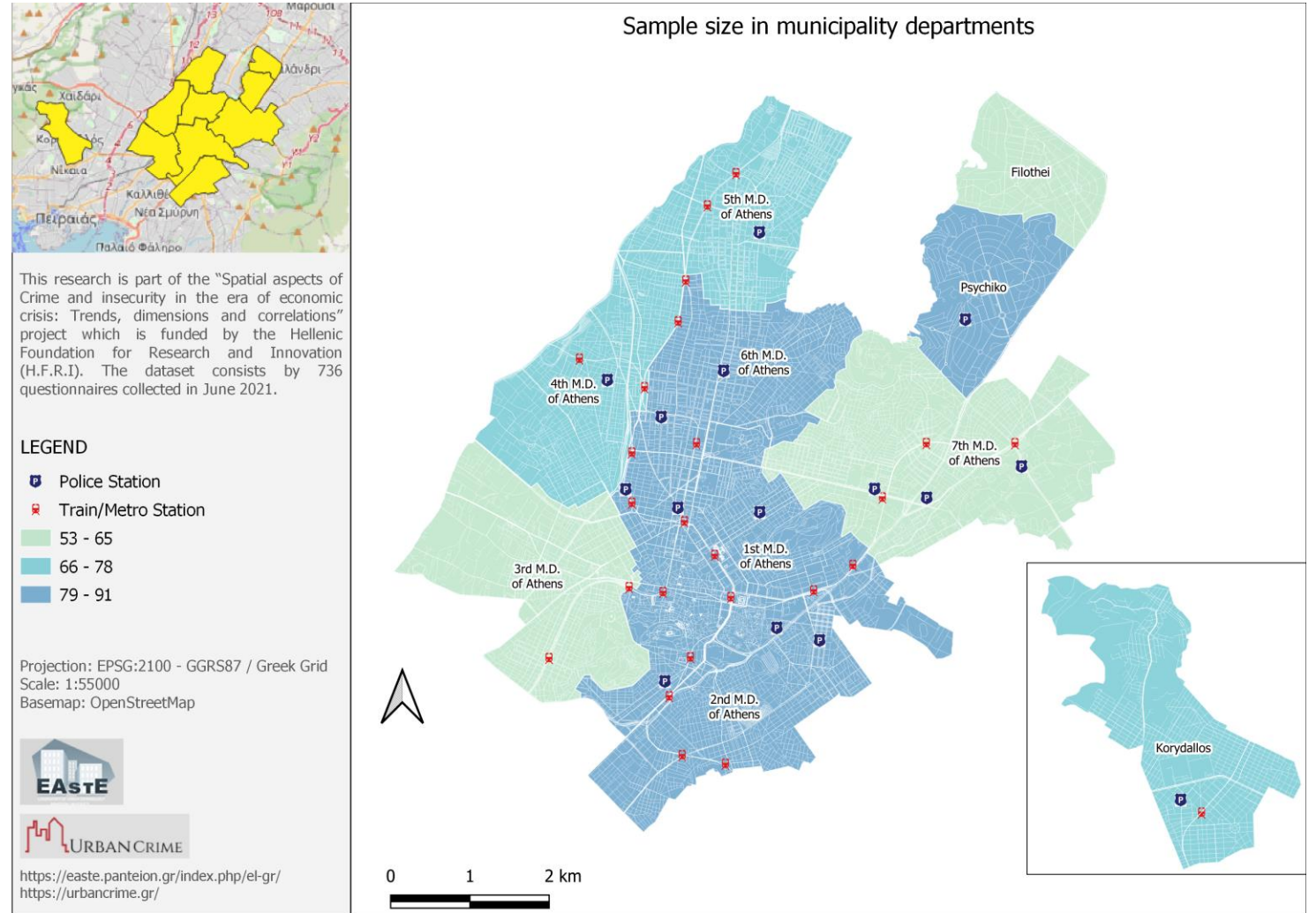
A bit unsafe; 21.7%
Very unsafe; 11.2%
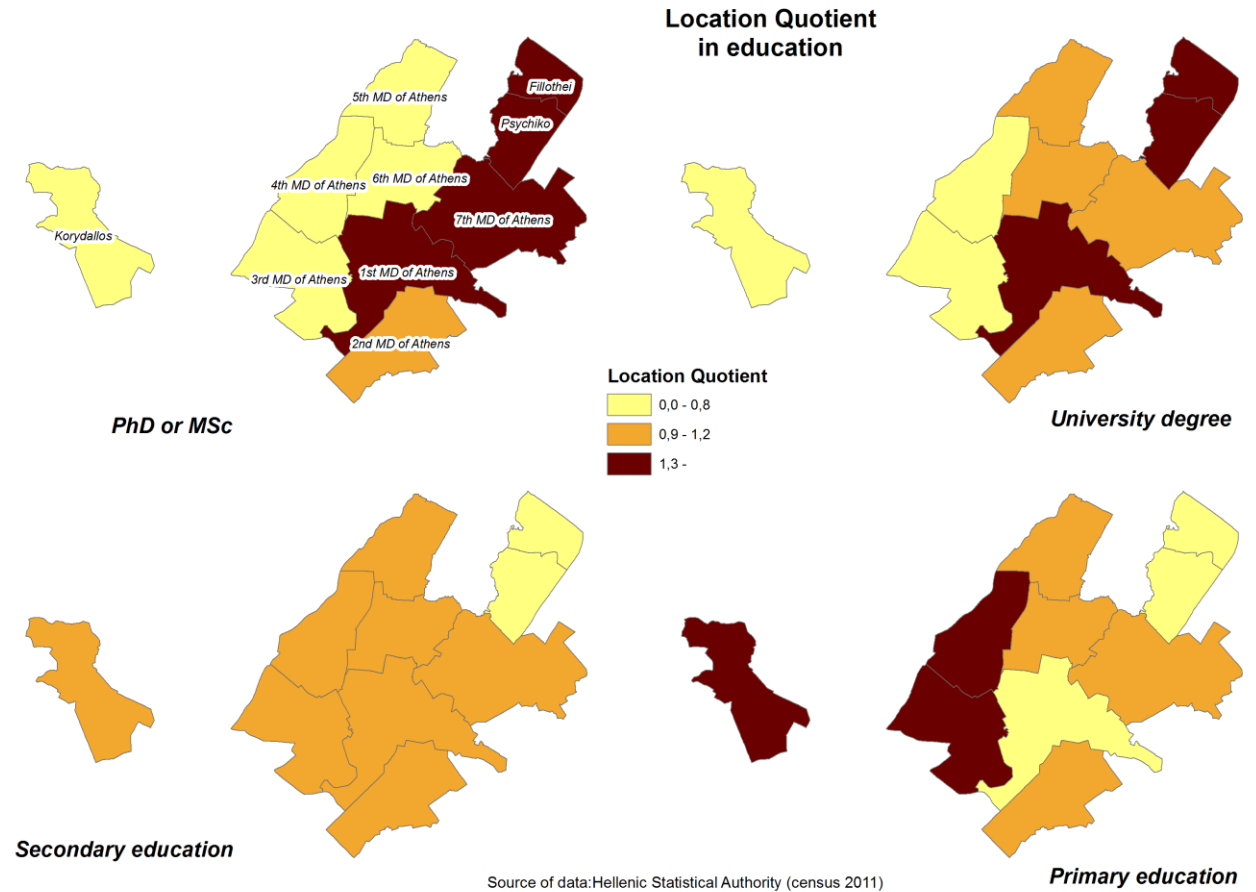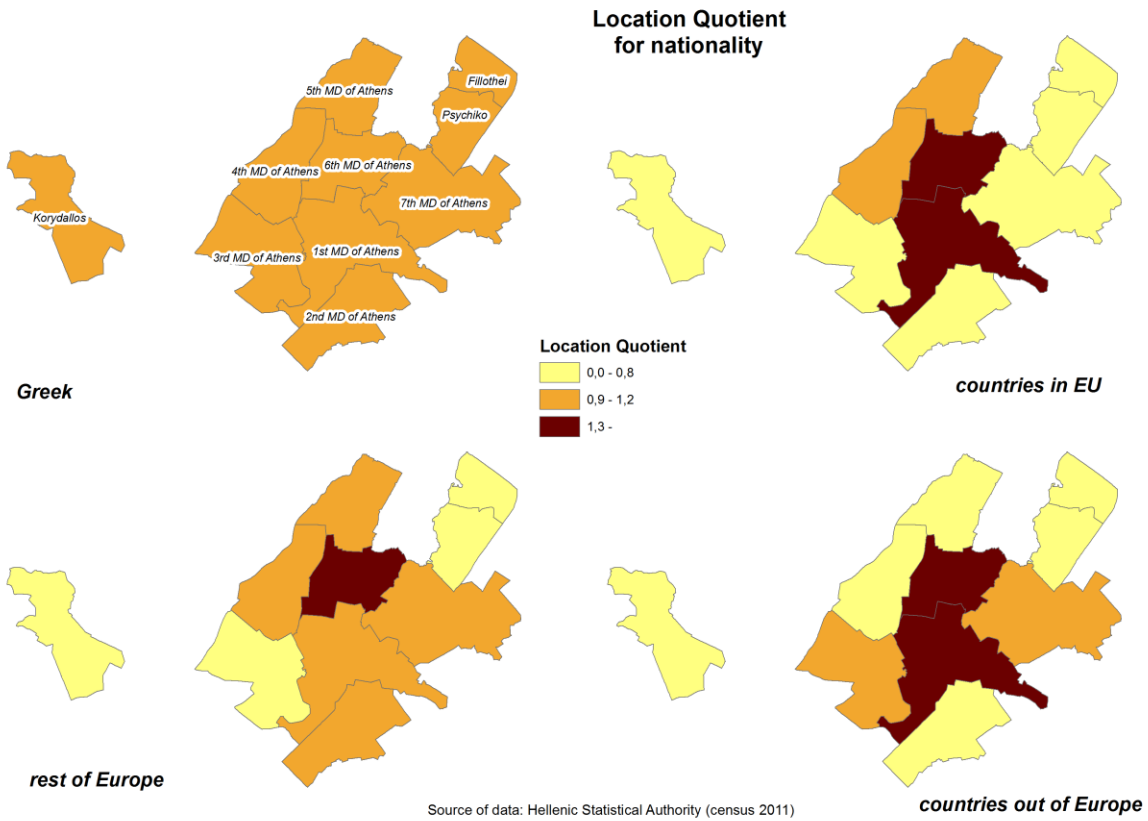Unsafe (33.8%)
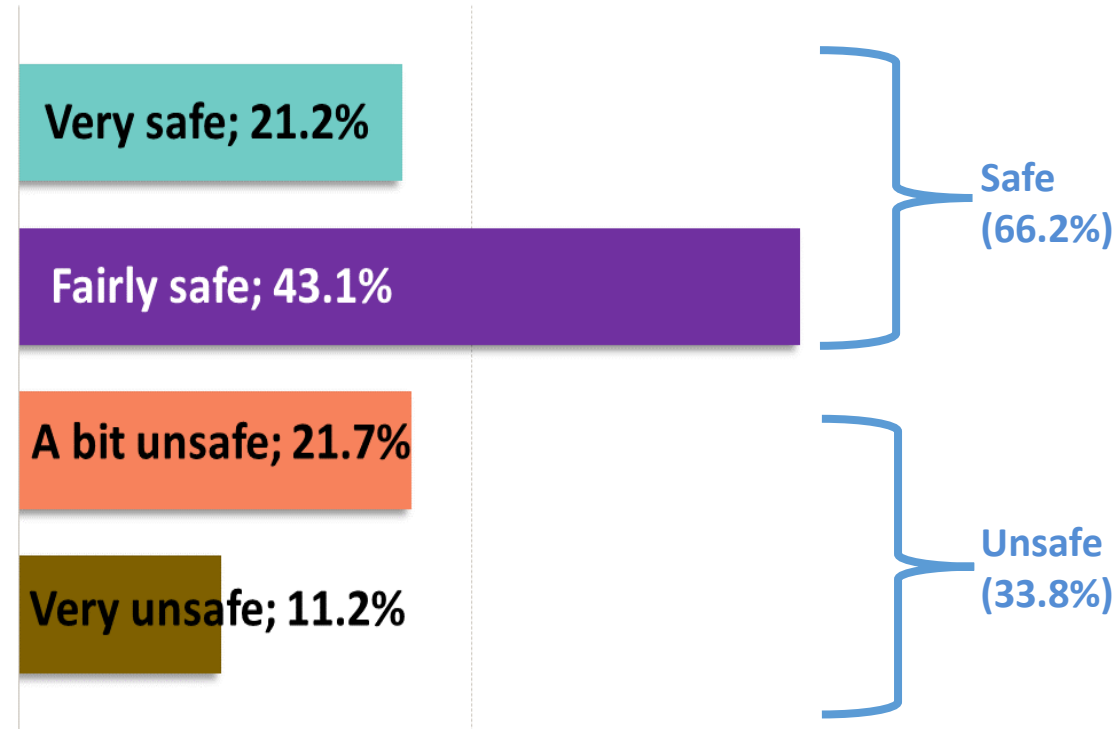
In the decade 2009-2019

Sample size

In the map we illustrate the sample size at municipality department level. Train and metro stations as well as police stations can be seen.

The municipalities included are

- Athens (7 MDs with 664k population),

- Filothei-Psychiko (2 MDs with 27k population) and

- Korydallos (1 MD with 64k population).

This research is part of the "Spatial aspects of Crime and insecurity in the era of economic crisis: Trends, dimensions and correlations" project which is funded by the Hellenic Foundation for Research and Innovation (H.F.R.I). The dataset consists by 736 questionnaires collected in June 2021.

LEGEND

- Police Station
- Train/Metro Station
- 53 - 65
- 66 - 78
- 79 - 91

Projection: EPSG:2100 - GGRS87 / Greek Grid
Scale: 1:55000
Basemap: OpenStreetMap

EAstE

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Sample size in municipality departments

Location Quotient for nationality

Source of data: Hellenic Statistical Authority (census 2011)

Location Quotient in education

Source of data: Hellenic Statistical Authority (census 2011)
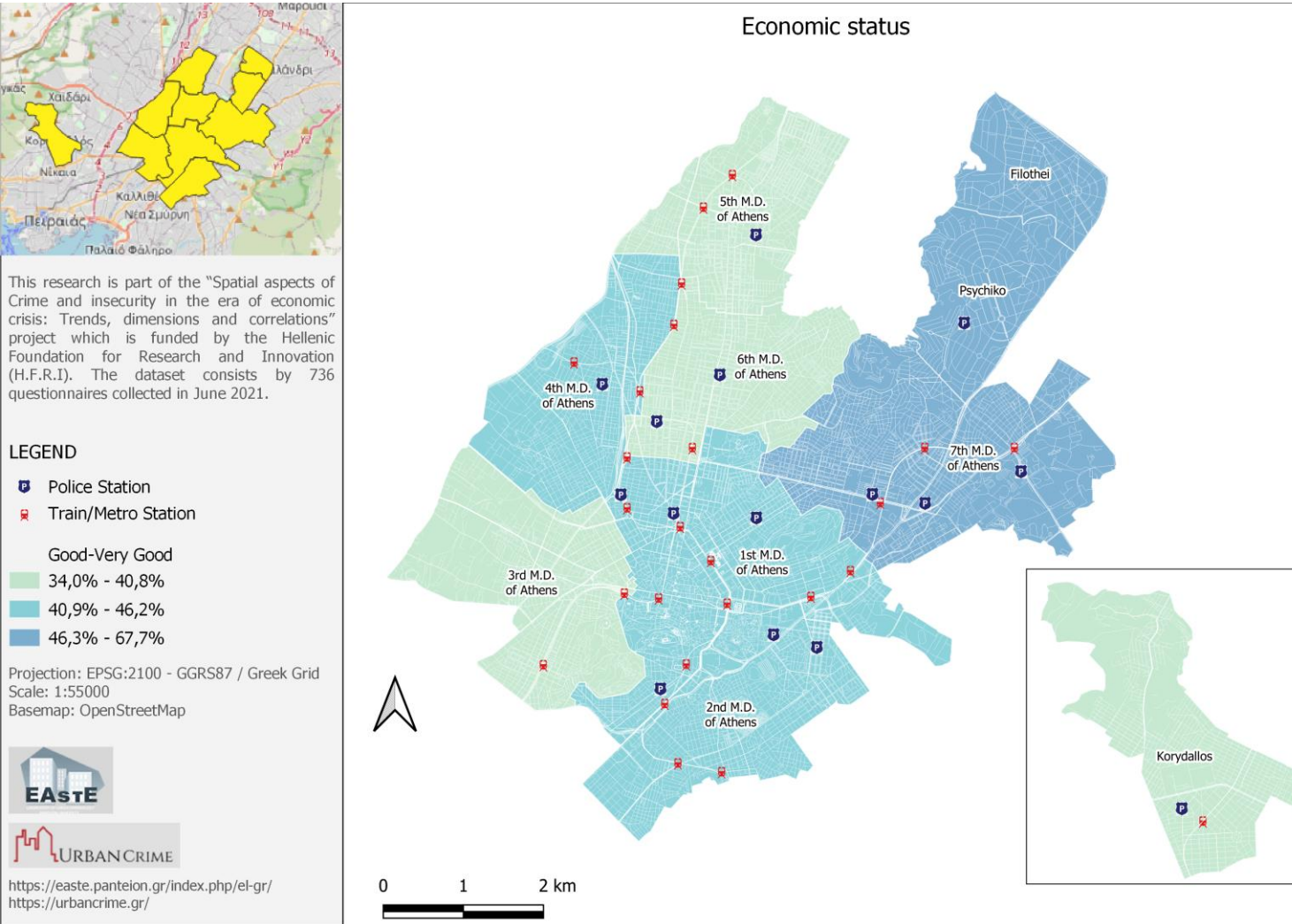
In the above map the Location Quotient on nationality of the permanent residents is displayed. The data are from the 2011 census.

The non-Greek residents are over-represented in 1st/6th MD.

Similarly, the LQ in education is illustrated above.

The highly educated residents are over-represented in 1st / 7th and Filothei-Psychiko MD.
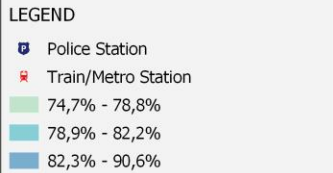
Economic status

In the map the percentage of the respondents that consider their economic status as good or very good.

The higher % are present in Folothei/Psychiko and in the 7th MD of Athens and the lower % are in Korydallos and in the 3rd, 5th and 6th MD of Athens.

It is worth noting that, in 2015, the mean income in the municipality of Filothei/Psychiko was 59.300€, in Athens was 26.400€ and in Korydallos was 19.500€.
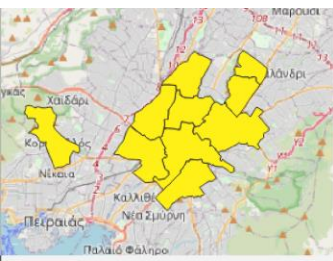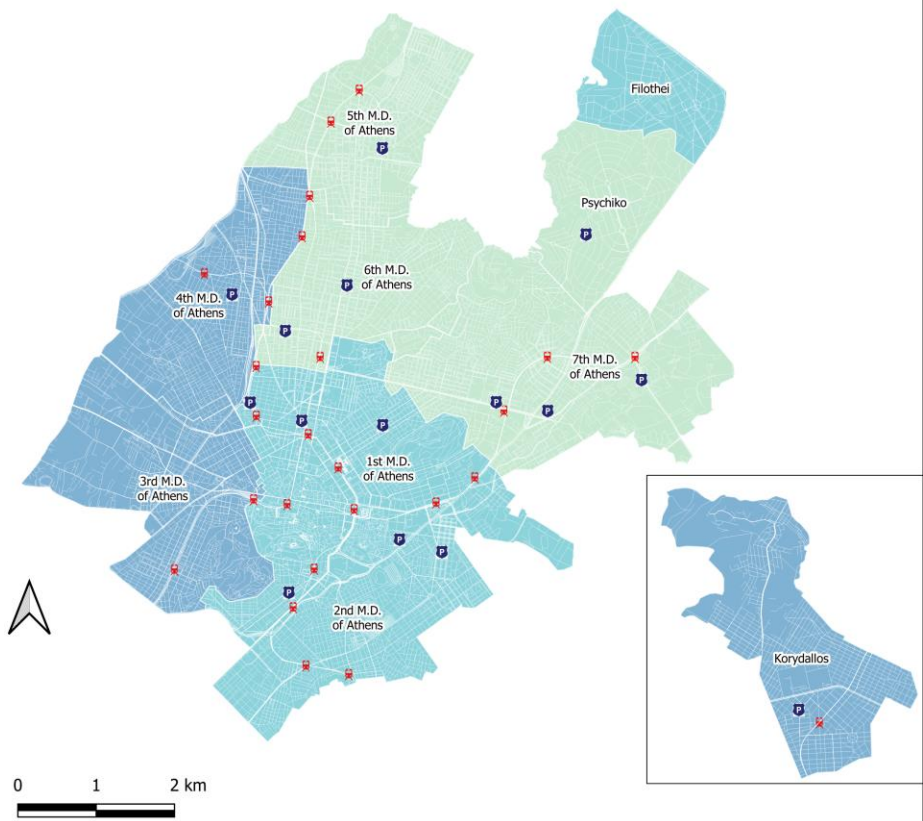
LEGEND

- 🛡 Police Station
- 🚉 Train/Metro Station

Good-Very Good

- 34,0% - 40,8%
- 40,9% - 46,2%
- 46,3% - 67,7%

Projection: EPSG:2100 - GGRS87 / Greek Grid
Scale: 1:55000
Basemap: OpenStreetMap

EAstE

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https://urbancrime.gr/

Economic status

Filothei

5th M.D. of Athens

Psychiko

6th M.D. of Athens

4th M.D. of Athens

7th M.D. of Athens

1st M.D. of Athens

3rd M.D. of Athens

2nd M.D. of Athens

Korydallos

0 1 2 km

Deterioration of the economic status of households due to the economic crisis

LEGEND

- Police Station
- Train/Metro Station
- 74,7% - 78,8%
- 78,9% - 82,2%
- 82,3% - 90,6%

Projection: EPSG:2100 - GGRS87 / Greek Grid
Scale: 1:55000
Basemap: OpenStreetMap

EAstE

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https://easte.panteion.gr/index.php/el-gr/
https://urbancrime.gr/

The effect of the crisis in the economic status of the households

Legend

32

- Expenses for food
- Expenses for heating
- Bills in total

Clusters
- 1st cluster
- 2nd cluster
- 3rd cluster
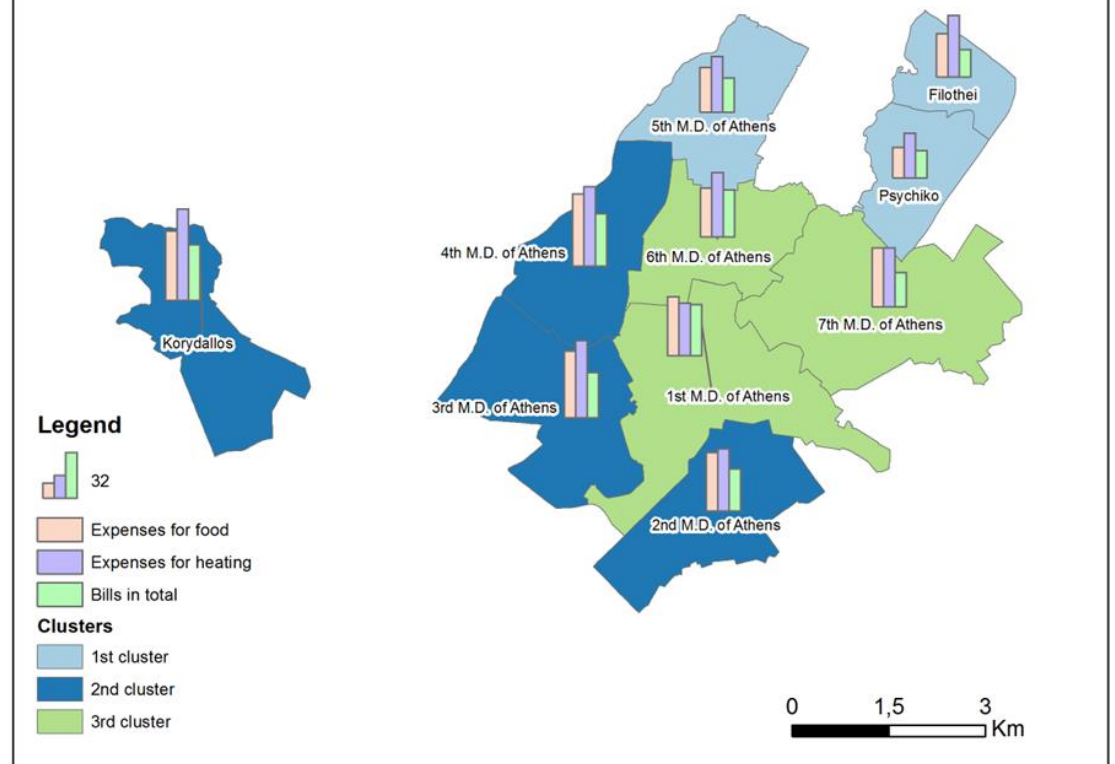
In the above map we illustrate the % of respondents that believe that their economic status has worsened during the economic crisis.

In the above map the hierarchical clustering of the MDs based on views of the respondents about the effects of the economic crisis on the economic status of their households is illustrated.
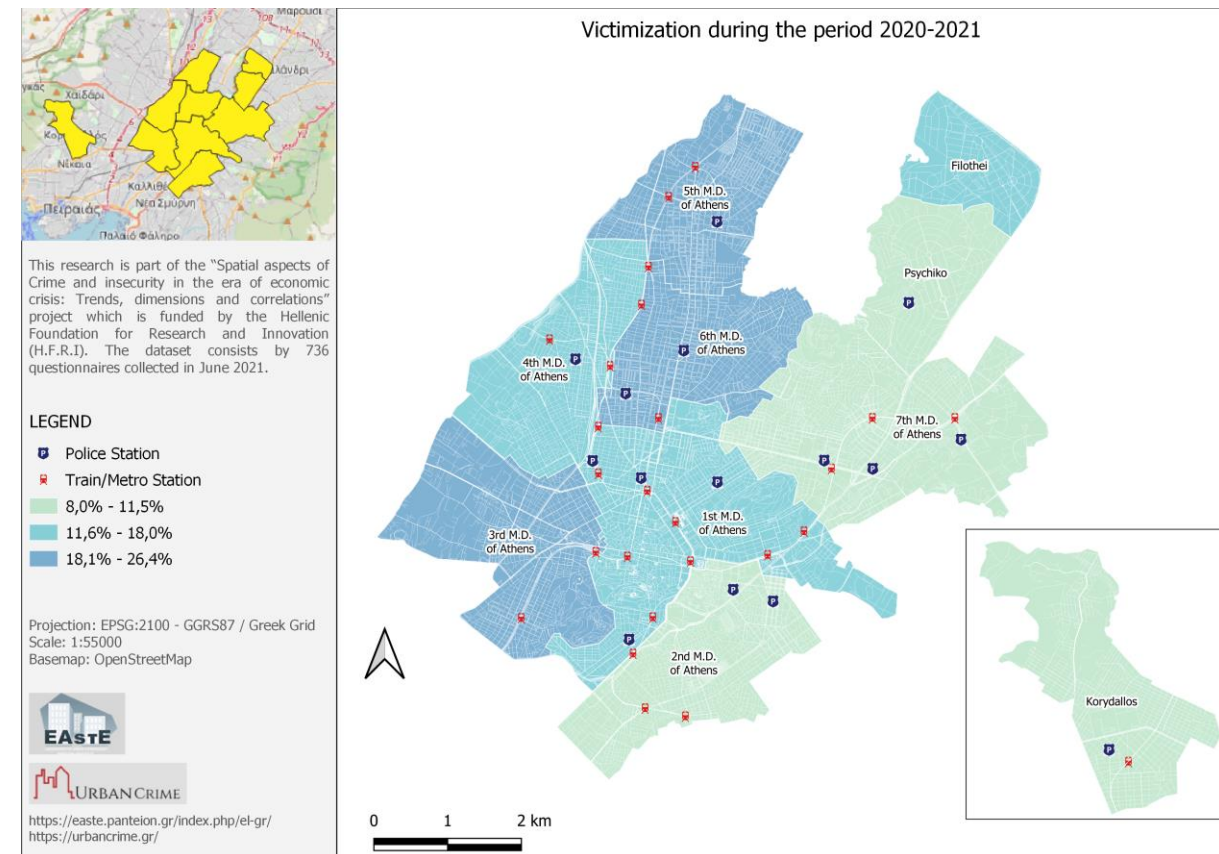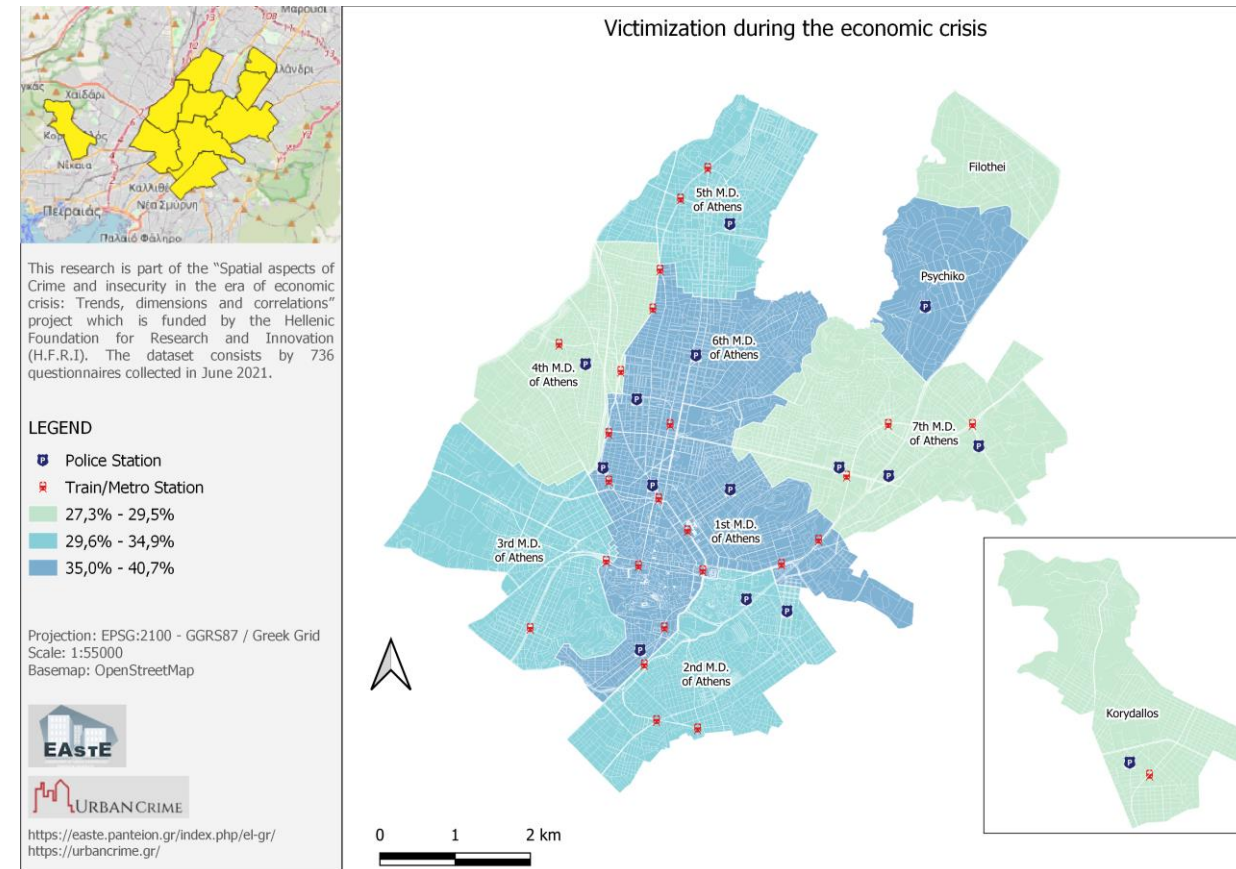
Crime level
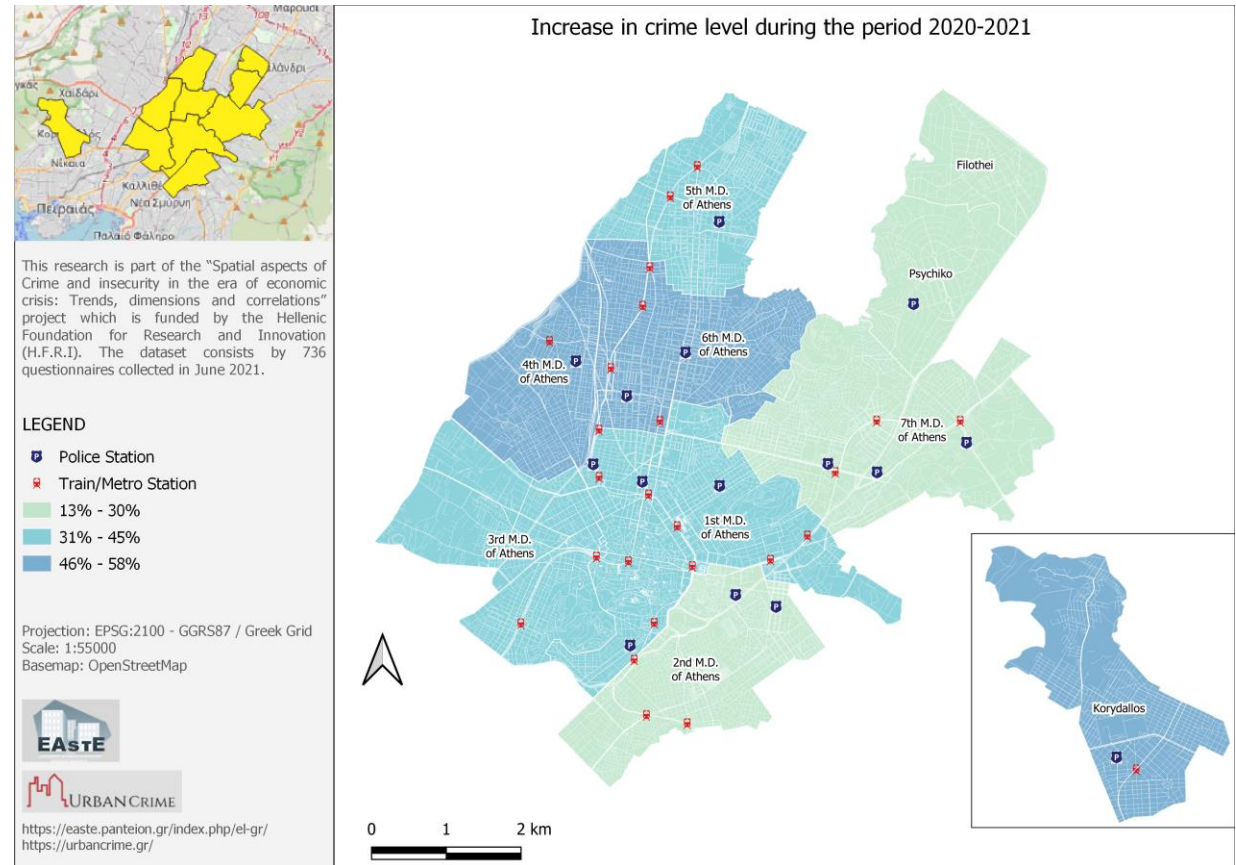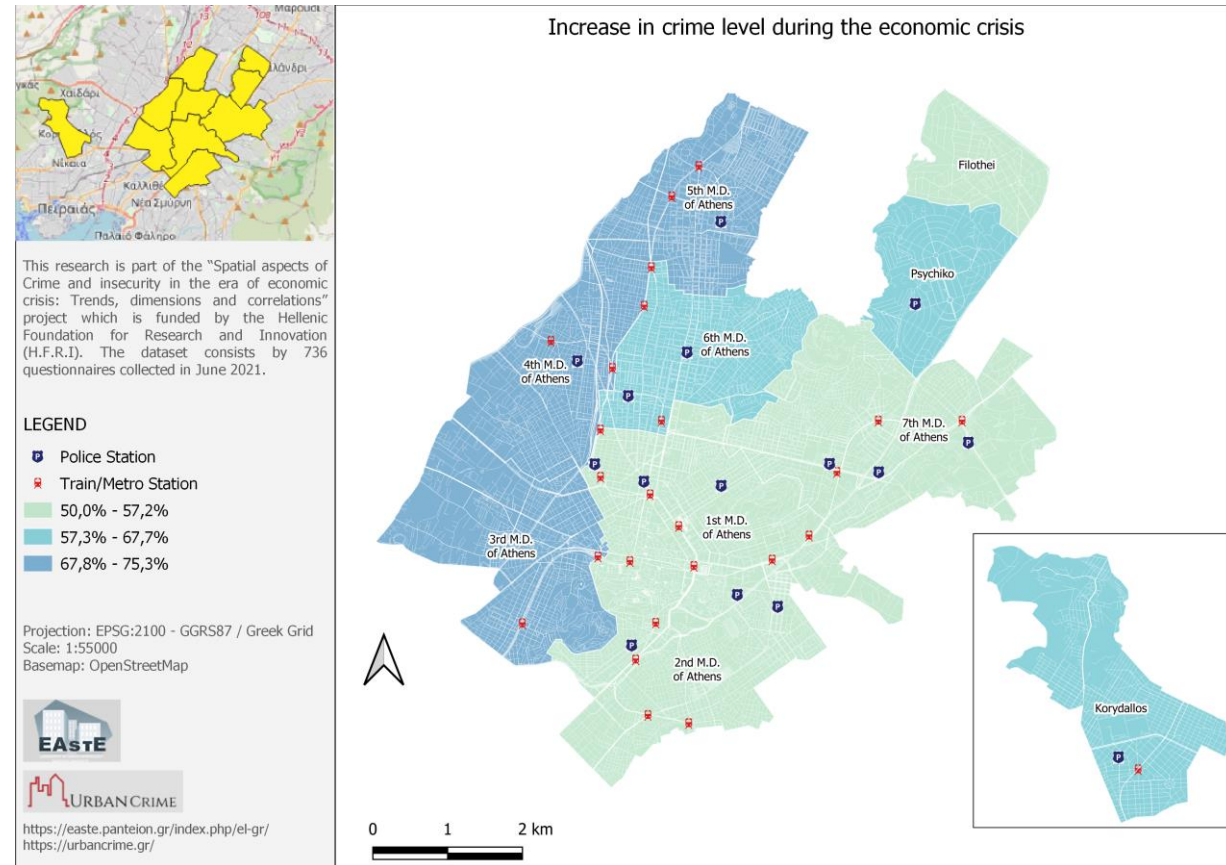
In the above map the percentage of the respondents that believe that the crime level has increased in their area during the economic crisis can be seen.

Similarly for the period 2020-2021.

The increase was considered high during the economic crisis and particularly in the west MDs of Athens.
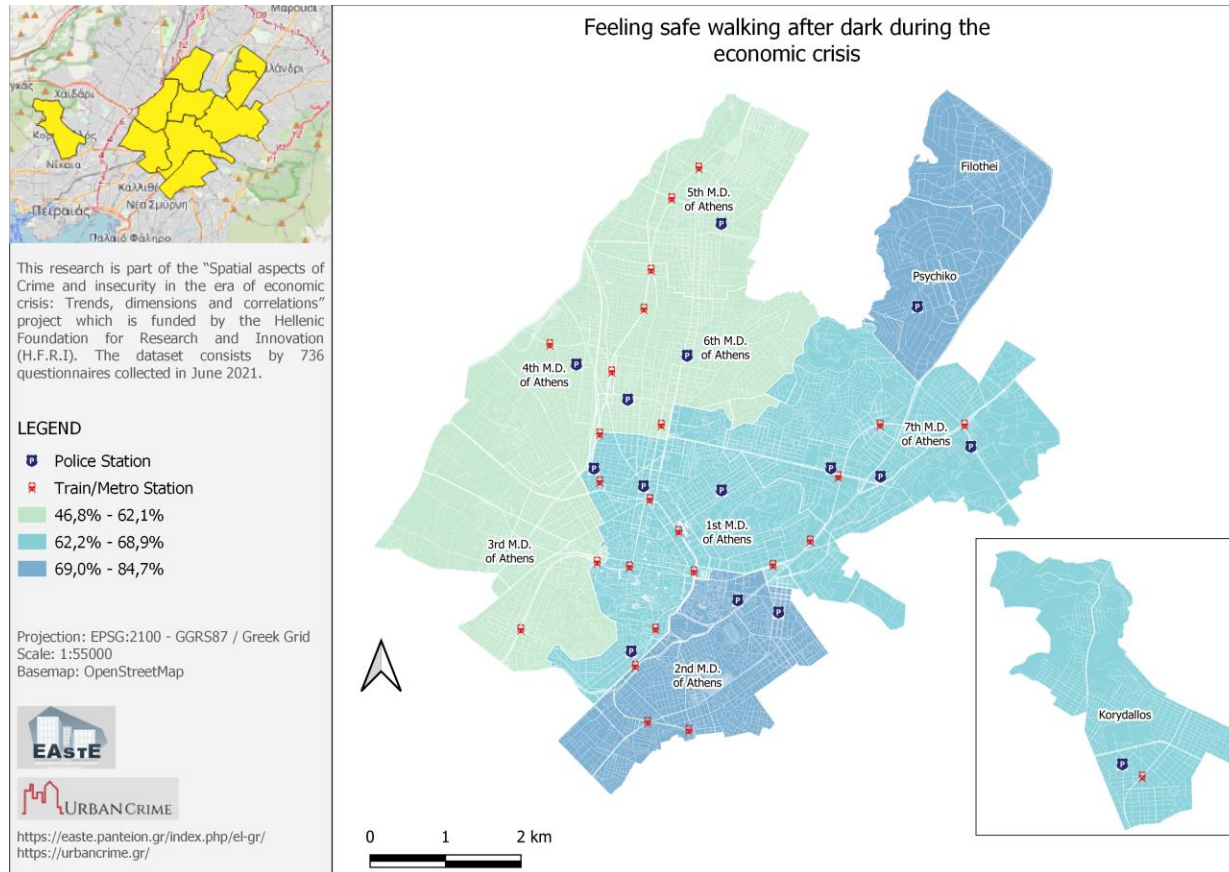
Victimization

In the above map, we illustrate the percentage of the respondents, or a member of their family that have been victimized during the economic crisis.
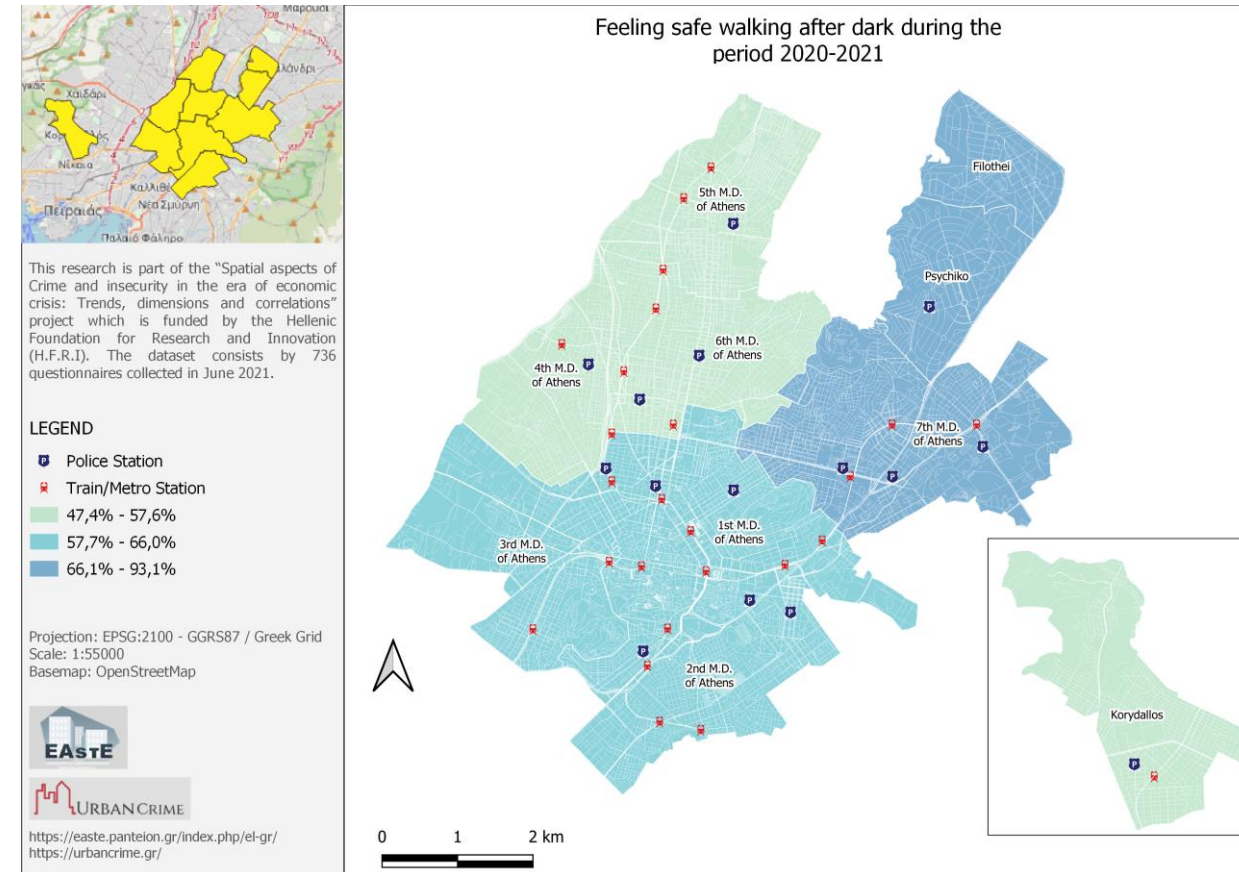
Similarly for the period 2020-2021.

The victimization in the economic crisis was higher in Psychiko and in 1st and 6th MDs of Athens.

Feeling safe

Feeling safe walking after dark during the economic crisis

This research is part of the "Spatial aspects of Crime and insecurity in the era of economic crisis: Trends, dimensions and correlations" project which is funded by the Hellenic Foundation for Research and Innovation (H.F.R.I). The dataset consists by 736 questionnaires collected in June 2021.

LEGEND
- Police Station
- Train/Metro Station
- 46,8% - 62,1%
- 62,2% - 68,9%
- 69,0% - 84,7%

Projection: EPSG:2100 - GGRS87 / Greek Grid
Scale: 1:55000
Basemap: OpenStreetMap

https://easte.panteion.gr/index.php/el-gr/
https://urbancrime.gr/

Feeling safe walking after dark during the period 2020-2021

This research is part of the "Spatial aspects of Crime and insecurity in the era of economic crisis: Trends, dimensions and correlations" project which is funded by the Hellenic Foundation for Research and Innovation (H.F.R.I). The dataset consists by 736 questionnaires collected in June 2021.

LEGEND
- Police Station
- Train/Metro Station
- 47,4% - 57,6%
- 57,7% - 66,0%
- 66,1% - 93,1%

Projection: EPSG:2100 - GGRS87 / Greek Grid
Scale: 1:55000
Basemap: OpenStreetMap

https://easte.panteion.gr/index.php/el-gr/
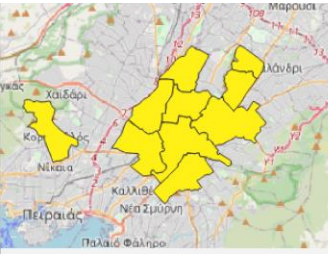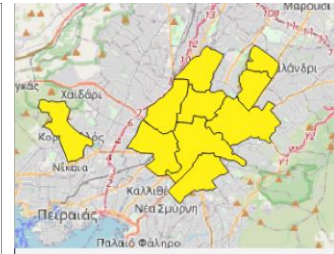https://urbancrime.gr/

In the above map, we illustrate the percentage of the respondents that feel safe walking in their area after dark, during the economic crisis.

Similarly for the period 2020-2021.

Filothei/Psychiko and the 2nd MD of Athens have the highest percentages of respondents feeling safe during the economic crisis.

Police work

Positive assessment of the police work during the economic crisis

Positive assessment of the police work during the period 2020-2021

In the above map, we illustrate the percentage of the respondents that assess positively the police work during the economic crisis.

Similarly for the period 2020-2021.

The highest satisfaction of the respondents are in Fillothei/Psychiko and the 7th MD of Athens.

Modeling (spatial econometrics)

	During economic crisis % frequency	During 20-21 %frequency
dependent variable: Feeling safe	63.7	62.2
covariates: Male	46.0	
Age	51.5 (mean)	
Length of residence in the same area		
< 1 year	1.1	
1-10 years	12.1	
> 10 years (base)	86.8	
Tertiary education	74.8	
Economic Status		
Good	45.7	
Medium	45.0	
Bad (base)	9.3	
Victimization	34.6	16.4
Satisfaction from the police work	41.4	48.3
Number of valid cases	604	

Note: All variables are binary (0/1), except from the length of residence and the economic status that is ordinal and the age that is continuous.

The models examine the relationship between fear of crime and several socioeconomic characteristics such as gender, age, economic status, education, length of residence and crime experience (Tseloni & Zarafonitou, 2008).

The responses of walking alone after dark feeling very safe and fairly safe, have been coded into 1 in the variable "feeling safe", those that have post-secondary education have been coded to 1 in the variable "Tertiary education" and those that responded that the police work is very or enough effective have been coded to 1.

The responses have been geocoded and we have built a Probit and a SAR Probit model (Lesage et al., 2011; Lesage & Pace 2009; Anselin, 2002).

The results have been produced in R by using the packages "spatialprobit" (Wilhelm και de Mattos, 2013) and "margins" (Leeper, 2021).

Probit model

	During the crisis	After the crisis
(intercept)	-0.20	−0.65 **
	(0.21)	(0.21)
Male	0.45 ***	0.56 ***
	(0.11)	(0.11)
Age	0.01	-0.06
	(0.06)	(0.06)
Length of residence in the same area (>10 years)		
1 - 10 years	−0.36 *	0.03
	(0.17)	(0.18)
< 1 year	0.15	0.23
	(0.52)	(0.52)
Tertiary education	0.34 **	0.56 ***
	(0.13)	(0.13)
Economic status (Bad)		
Medium	0.48 *	0.52 **
	(0.19)	(0.20)
Good	0.61 **	0.78 ***
	(0.19)	(0.20)
Victimization	-0.12	-0.20
	(0.11)	(0.15)
Dissatisfaction from the police work	−0.49 ***	−0.46 ***
	(0.11)	(0.11)
AIC	745.05	723.36
BIC	789.08	767.39

*** p < 0.001; ** p < 0.01; * p < 0.05.

In both models the statistically significant variables are the gender, the education, the economic status and the dissatisfaction from the police work.

In the models, males have greater probability of feeling safe as well as those that have tertiary education. On the other hand, those who are dissatisfied from the police work have lower probability of feeling safe. Also, those with a good economic status have higher probability of felling safe in comparison with those with bad economic status.

Below we can see the marginal effects.

	During the crisis	After the crisis
Male	0.155 ***	0.187 ***
Age	0.000	-0.001
Length of residence in the same area (>10 years)		
1 - 10 years	-0.126 *	0.009
< 1 year	0.049	0.073
Tertiary education	0.118 **	0.194 ***
Economic status (Bad)		
Medium	0.175 *	0.187 **
Good	0.221 **	0.274 ***
Victimization	-0.041	-0.068
Dissatisfaction from the police work	-0.168 ***	-0.156 ***

*** p < 0.001; ** p < 0.01; * p < 0.05.

SAR probit model

	During the crisis	After the crisis
(Intercept)	-0.35	−0.52
	(0.28)	(0.31)
Male	0.47 ***	0.59 ***
	(0.11)	(0.12)
Age	0.00	-0.00
	(0.00)	(0.00)
Length of residence in the same area (>10 years)		
1 - 10 years	−0.36 *	0.02
	(0.17)	(0.18)
< 1 year	0.17	0.15
	(0.54)	(0.51)
Tertiary education	0.32 *	0.51 ***
	(0.13)	(0.13)
Economic status (Bad)		
Medium	0.49 *	0.55 **
	(0.19)	(0.21)
Good	0.60 **	0.78 ***
	(0.19)	(0.22)
Victimization	-0.14	-0.17
	(0.11)	(0.15)
Dissatisfaction from the police work	−0.47 ***	−0.47 ***
	(0.11)	(0.12)
ρ	0.32 ***	0.34 ***
	(0.10)	(0.09)

*** p < 0.001; ** p < 0.01; * p < 0.05.

	Posterior mean		
	Direct effect	Indirect effect	Total effect
Male	0.159 ***	0.076 ***	0.235 ***
Age	0.000	0.000	0.000
Length of residence in the same area (>10 years)			
1 - 10 years	-0.121 *	-0.057 *	-0.179 *
< 1 year	0.056	0.027	0.083
Tertiary education	0.110 *	0.051 *	0.161 *
Economic status (Bad)			
Medium	0.167 *	0.080 *	0.248 *
Good	0.205 **	0.098 **	0.302 **
Victimization	-0.046	-0.022	-0.069
Dissatisfaction from the police work	-0.160 ***	-0.076	-0.236 ***

*** p < 0.001; ** p < 0.01; * p < 0.05.

	Posterior mean		
	Direct effect	Indirect effect	Total effect
Male	0.193 ***	0.098 ***	0.291 ***
Age	-0.001	-0.000	-0.002
Length of residence in the same area (>10 years)			
1 - 10 years	0.009	0.004	0.012
< 1 year	0.050	0.027	0.078
Tertiary education	0.169 ***	0.084 ***	0.253 ***
Economic status (Bad)			
Medium	0.180 **	0.090 **	0.271 **
Good	0.257 ***	0.129 ***	0.385 ***
Victimization	-0.056	-0.027	-0.083
Dissatisfaction from the police work	-0.155 ***	-0.077	-0.232 ***

*** p < 0.001; ** p < 0.01; * p < 0.05.

Conclusions

- The sectors mostly affected by the economic crisis in Greece are the unemployment, the poverty, the trade, the quality of life and crime.

- The majority of the sample reported that their household's financial situation worsened during the economic crisis, especially in terms of the family income and savings as well as the expenses for entertainment, heating and food.

- Impact of the economic crisis on the Municipality: closing shops, increase of unemployment, degradation of quality of life and reference to further social and environmental degradation follows.

- Crime is reported to have increased in 2009-2019 in the Greek territory and also in the area of residence.

- The majority of the sample reported feeling safe walking alone after dark during the economic crisis.

Conclusions

Korydallos MD. The economic status of the respondents is not considered good. The economic status of the house holds worsened during the crisis and the effect was high on various sectors.

During the economic crisis, victimization is lower while after that we notice an increase in crime levels, with a low % of feeling safe but lower % of victimization in comparison with the other MDs.

6th MD of Athens. The economic status of the respondents is not considered as good. The deterioration of the economic status of the household is high.

In the 6th MD during the economic crisis, we notice a high % of victimization with low felling of security while in the following years (2020-2021) we notice an increased % of crime level, in victimization and a low % in feeling safe walking after dark.

(similar conclusions can be drawn for other MDs of Athens e.g. 3rd , 4th , 5th)

Psychiko MD. The economic status of the respondents is considered as good. The effect of the economic crisis in the economic status of the household has a lower % in comparison with other MDs.

During the economic crisis, victimization is higher as well as the % of feeling safe while after that we notice a low % in the increase in crime levels and victimization, along with a high feeling of security in comparison with the other MDs.

Filothei MD has similar but better results except that during the economic crisis, victimization is low .

Conclusions

- Two models have been built. The first refers to the economic crisis period while the second refers to the last two years 2020-2021. The models have been spatially extended.

- In all the models the statistically significant variables are the gender, the education, the economic status, the satisfaction from the police work and the coefficient of spatial dependence ρ.

- More specifically, men have higher probability to feel safe, as well as respondents with high education. Also, the dissatisfaction from the police work has a negative impact in the probability to feel safe walking in the dark. Finally, good and medium economic status have a positive impact on the safety feeling in comparison with base status which is the bad economic status.

- As far as the model of the economic crisis and the corresponding of the period 2020-2021, when comparing the impact of the covariates on the safety feeling, we notice that in both spatial and aspatial model, there is an increase in the effect of the gender, education and economic status. Also, the satisfaction of the police work in the spatial models remains constant.

- At the end, the statistically significant and high value of «ρ» in both models, denotes an important spatial dependence of the probability of the respondents to feel safe with their "neighbors".

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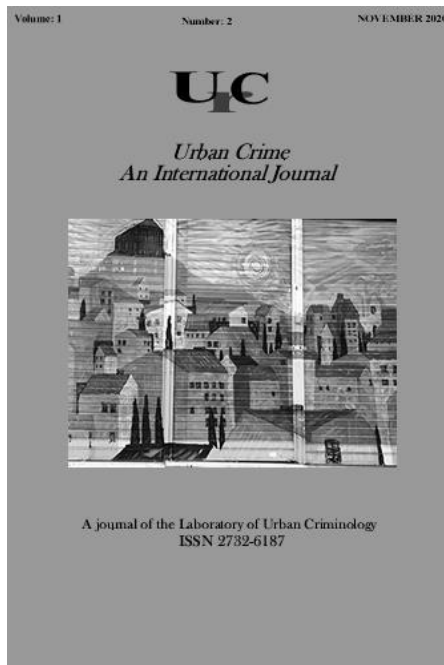
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