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EFFECTS OF ECONOMIC DEVELOPMENT AND MIGRATION ON THE CRIME RATES WITHIN THE EUROPEAN UNION*

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ABSTRACT

In this study, effects of economic development and migration on the crime rates are investigated for the European Union countries. In the study, economic development level is measured in terms of gross domestic product per capita in purchasing power parity (GDP per capita in PPP). Six crime categories are considered; intentional homicides, rape, assault, sexual assault, theft and vandalism as a number of occurrences per hundred thousand inhabitants of countries. Migration rate is measured as a percentage of migrants of the total population per year. Data were obtained from Euro stat database and covers 30 nations for the period of 2008-2013. In the study, we first performed principal component analysis (PCA). The objective of the PCA is to determine the crime factor scores which represent a crime levels as a whole for each of the nations, and also to determine the important components of these crime factor scores. Then, a cross-country regression analysis performed as crime factor scores a dependent variable and economic development level and migration rate as independent variables. Results show that, a significant positive relation exists between the economic development level and the crime factor scores. Also, high migration rates don't lead to higher crime rates.

Keywords: European Union, crime rates, economic development

AVRUPA BİRLİĞİNDE EKONOMİK GELİŞME VE GÖÇÜN SUÇ ORANLARI ÜZERİNE ETKİLERİ

ÖZ

Bu çalışmada, Avrupa Birliği ülkeleri dikkate alınarak, ekonomik gelişme ve göçün toplum içinde meydana gelen çeşitli suç oranları üzerine olan etkileri araştırılmıştır. Ekonomik gelişmişlik, satınalma gücü paritesine göre kişi başına düşen milli gelir ile ölçülmüştür. Çalışmada, ülke nüfuslarının her yüz bin kişi başına düşen olay sayısına göre gerçekleşen altı adet suç kategorisi dikkate alınmıştır; adam öldürmeğe teşebbüs, tecavüz, saldırı, cinsel saldırı, hırsızlık ve vandalizim. Göç oranı ise, ülkenin bir yıl içinde kabul ettiği göçmen sayısının toplam ülke nüfusuna oranı olarak hesaplanmıştır. Çalışmanın verileri Euro stat veri tabanından elde edilmiş olup toplam 30 ülkeyi ve 2008-2013 dönemini kapsamaktadır. Çalışmada öncelikle altı çeşit suç kategorisi kullanılarak temel bileşenler faktör analizi gerçekleştirilmiş ve her ülke için genel bir suç faktörü skoru hesaplanmıştır. Daha sonra bu suç skorları bağımlı değişken,

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satınalma gücü paritesine göre kişi başına düşen milli gelir ve göç oranı bağımsız değişkenler olacak şekilde çapraz kesit regresyon analizi gerçekleştirilmiştir. Çalışmanın sonuçları, ekonomik gelişme ile suç faktörü arasında anlamlı pozitif bir ilişki bulunduğunu göstermektedir. Ancak, göç oralarındaki artışlarla suç oranları arasında anlamlı bir ilişki bulunamamıştır.
Anahtar kelimeler: Avrupa Birliği, suç oranları, ekonomik gelişme

1. Introduction

Hemley & Pheters (1975) stated that economic development while providing wealth for the people may also create unwanted externalities and moral hazards in the society. Advanced economies concentrate people in urban and metropolitan areas and this concentration may lead to increase the opportunities of various types of crimes. Gould, et al (2002) found strong relation between unemployment rate and crime rates in the U.S. Machin &Meghir (2004) stated that during the 1980s and 1990s in England, rising property crime rates are srongly associated with the areas that experienced lower wage and lower wage growth. Duha T. A. (2012) used earthquakes, industrial accidents and the exchange rate movements as instruments for the unemployment rate and investigated the impact of unemployment on crime using a country-level panel data set from Europe, and found that unemployment has a positive influence on property crimes. Khan, N., et al (2015) examined multiple factors i.e., education, unemployment, poverty and economic growth which contributed to the rate of crimes in Pakistan during the period of 1972-2011. The study finds a positive relationship between crime rates and unemployment rate and negative relationship between the crime rates and the higher education Pakistan. The study further assesses that GDP per capita leads to higher crime rates in the long-run but to lower rates in the short-run. Higher income shows that there are greater benefits for criminals as for thefts and robberies. Affluent areas attract more criminals due to the opportunities available to them. Finally they stated that there is a positive relationship between the crime rates and poverty in the long-run but there is a negative relationship in the short-run. Poverty may lead to a high level of stress and mental illness which in turn causes individuals to adopt the criminal behavior. The study posits a caution that policy formulation in ameliorating crimes in Pakistan should anchor both social and economic factors.

Engelen, P.J., et al. (2015) used panel data techniques to estimate an integrated crime model for property and violent crime using the entire population of all 100 counties in North Carolina for the years 2001–2005. Their results supported the economic explanation of crime with respect to the deterrent effect of the probabilities of arrest and imprisonment concerns, as well as the time allocation model of criminal activities. They stated that the integrated model rejected the impact of the severity of punishment on crime levels. They found most support for the social disorganization theory and for the routine activity theory with respect to the sociological theories of crime. They also state that the differences between property and violent crimes, mostly explained by the sociological models. Goulas, E. & Zervoyianni, A. (2015) examined the relationship between crime and per-capita output growth in a panel of 26 countries for 1995– 2009, did not find a general strong negative relationship between percapita output growth and crime. Their estimates suggest significant potential gains from

reducing crime during periods of worsening economic conditions, when market sentiment is pessimistic, and thus uncertainty regarding the return to saving is above average, employment is low, and the strain on government-sector resources through high public-safety spending is already sizable.

In the next section, we described the sample and variable selection process. In section 3 we performed principal component analysis (PCA). The objective of the PCA is to determine the crime factor scores which represent a crime levels as a whole for each of the nations, and also to determine the important components of these crime factor scores. Then, in section 4 a cross-country regression analysis performed as crime factor scores a dependent variable and economic development level and migration rate as independent variables. Finally, in section 5 we concluded the article.

2. The sample and definition of the variables

The data were obtained from Euro stat database[2] and covers 30 nations for the period of 2008-2013 (Table 1). In the study, economic development level is measured in terms of gross domestic product per capita in purchasing power parity (GDP per capita in PPP). Table 2 gives the averages for the period of 2008-2013 of six crime categories considered in the study; intentional homicide, rape, assault, sexual assault, theft and vandalism as a number of occurrences per year per hundred thousand inhabitants of countries. Migration rate is measured as a percentage of migrants of the population of the nations per year. In Table 2, averages and standard deviations of the crimes are given for the 30 EU nations.

Table 1. Selected EU Countries and Classification Into Groups

Advanced EU economies*	**Other advanced EU economies**	**Developing EU economies**
Belgium	Czech Rep.	Bulgaria
Denmark	Estonia	Latvia
Germany	Cyprus	Lithuania
Greece	Malta	Hungary
Spain	Slovakia	Poland
France	Slovenia	Romania
Ireland	Iceland	Croatia
Italy		
Luxembourg		
Netherlands		
Austria		
Portugal		
Finland		
United King.		
Sweden		
Norway♦		

[2] http://ec.europa.eu/eurostat/data/database

*Norway ♦*doesn't want to participate to the EU*

Intentional Homicide means unlawful death purposefully inflicted on a person by another person. Data on intentional homicide should also include serious assault leading to death and death as a result of a terrorist attack. It should exclude attempted homicide, manslaughter, death due to legal intervention, justifiable homicide in self-defence and death due to armed conflict.

The definition of **rape** used in this data collection is "sexual intercourse without valid consent". In the current classification, offences of statutory rape where the victim is below the age of consent are classified separately as sexual offences against children.

Assault means physical attack against the body of another person resulting in serious bodily injury, excluding indecent/sexual assault threats and slapping/punching. 'Assault' leading to death should also be excluded.

Sexual Assault means sexual violence not amounting to rape. It includes an unwanted sexual act, an attempt to obtain a sexual act, or contact or communication with unwanted sexual attention not amounting to rape. It also includes sexual assault with or without physical contact including drug-facilitated sexual assault; sexual assault committed against a marital partner against her/his will, sexual assault against a helpless person, unwanted groping or fondling, harassment and threat of a sexual nature.

Table 2. GDP per capita in PPP, number of occurrence of crimes and migration rates (averages of the period 2008-2013).

Nations	GDP per capita in PPP ($)	Int. Hom.	Rape	Assault	Sex. Ass.	Theft	Vand.	Migr. (%)
Austria	31,783	1	10	46	41	1,826	12	0.91
Belgium	29,650	2	29	690	68	2,157	17	3.18
Bulgaria	3,650	2	3	38	7	598	27	0.27
Croatia	8,700	1	4	22	11	349	3	0.83
Cyprus	18,117	1	4	20	5	178	13	3.17
Czech Republic	11,433	1	6	174	13	1,246	15	0.14
Denmark	37,567	1	6	185	28	3,445	14	0.80
Estonia	9,067	5	9	8	8	1,589	16	1.15
Finland	30,917	2	17	667	11	2,241	10	1.15
France	27,583	1	16	296	22	1,207	15	1.87
Germany	29,450	1	9	629	50	2,302	13	1.28
Greece	17,964	1	2	58	5	988	18	1.67
Hungary	8,917	1	2	136	5	1,259	12	1.14
Ireland	36,783	2	10	322	26	1,458	12	2.71
Italy	23,350	1	10	113	8	1,711	15	1.13

Latvia	6,517	4	3	53	23	1,195	21	1.62
Lithuania	7,717	7	6	7	8	807	6	0.07
Luxembourg	64,350	1	13	462	24	1,565	12	6.60
Malta	13,417	1	4	45	16	1,946	12	1.25
Netherlands	33,033	1	10	365	48	4,000	18	1.70
Norway	52,600	1	21	60	30	2,633	5	2.52
Poland	8,150	1	4	1	21	548	7	0.08
Portugal	14,650	1	3	283	18	934	12	2.18
Romania	4,650	2	5	64	3	244	15	0.99
Slovakia	9,100	2	2	44	24	451	10	0.05
Slovenia	15,383	1	3	101	18	1,506	9	0.82
Spain	20,650	1	4	83	17	328	13	2.59
Sweden	34,650	1	59	917	107	4,070	11	4.07
Un.King..	30,700	1	29	646	42	2,610	22	2.94
Mean	**22.1**	**1.7**	**10.4**	**225.4**	**24.5**	**1,565**	**13.2**	**1.7**
Std dev.	**14.8**	**1.4**	**12.0**	**257.4**	**22.4**	**1,056**	**5.0**	**1.4**

Theft means depriving a person or organization of property without force with the intent to keep it. Theft excludes burglary, housebreaking, robbery, and theft of a motorized land vehicle, which are recorded separately.

Vandalism is defined as willful or malicious destruction or defacement of public or private property.

Migration defined as the movement of people from one place to another. In the study, migration rate is measured as a percentage of migrants of the total population; number of migrants who obtained long-term (five year or longer) residents by citizenship on 31 December of each year is divided by the population for each nation (Eurostat Statistics in focus — 45/2012).

3. Principal Component Analysis

The objective of the principal component analysis (PCA) is to determine the crime factor scores which represent a crime levels as a whole for each of the nations, and also to determine the important components of these crime factor scores.

Table 3. Communalities*

	Extraction
Sexual Assault	,891
Rape	.843
Assault	.744
Theft	.645
Intentional Homicide	.095

*Extraction Method: Principal component Analysis.

Table 3 gives the SPSS outputs of the communality for a given variable (crime type), can be interpreted as the proportion of variation in that variable explained by the crime factor score. In other words, if we perform multiple regression of Sexual Assault rate against the crime factor scores, we obtain an R^2 = 0.891, indicating that about 89.1% of the variation in Sexual Assault rate is explained by the factor model. The results suggest that sexual assault is the most important component of the crime factor; rape, assault, theft and intentional homicide follow this crime type respectively.

4. Cross-country Regression Analysis

In this section a cross-country regression analysis was performed, in order to observe that economic development which is measured by GDP per capita in PPP and migration rates (independent variables) have any explanatory power on crime factor scores (dependent variable). Table 4, A, B and C gives the SPSS outputs of the regression model. Result of the regression analysis show that a significant positive relation exists between GDP per capita and crime factor scores. But, if the migration rate is considered, there is no any significant relation with the crime factor scores.

Table 4. Results of The Cross-Country Regression Analysis

4.A. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.584[a]	.341	.334	.81623630

a. Predictors: (Constant), Mig_per_hun.thous, GDP_per_cap_1

4.B. ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.073	2	29.536	44.333	.000[a]
	Residual	113.927	171	.666		
	Total	173.000	173			

a. Predictors: (Constant). Mig_per_hun.thous. GDP_per_cap

b. Dependent Variable: REGR factor score

4.C. Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig
		B	Std. Error	Beta		
1	(Constant)	-.885	.113		-7.855	.000
	GDP_per_cap	3.424E-5	.000	.500	6.244	.000

	Mig_per_hun. thous	.001	.001	.121	1.505	.134

a. Dependent Variable: REGR factor score

Standardized coefficients calculated in the regression analysis which can be used to unfold and compare the effects of the independent variable on the dependent variable, and refer to how many standard deviations of the dependent variable (crime score) will change, per standard deviation change in the independent variable (GDP). In Table 4.C, we can see that the standard coefficient of the GDP per capita equal to 0.50; that is, it could be expected that one standard deviation increase in GDP per capita leads to 0.50 times standard deviation of increase in crime factor scores.

Figure 1. GDP Per Capita Versus Crime Factor Scores

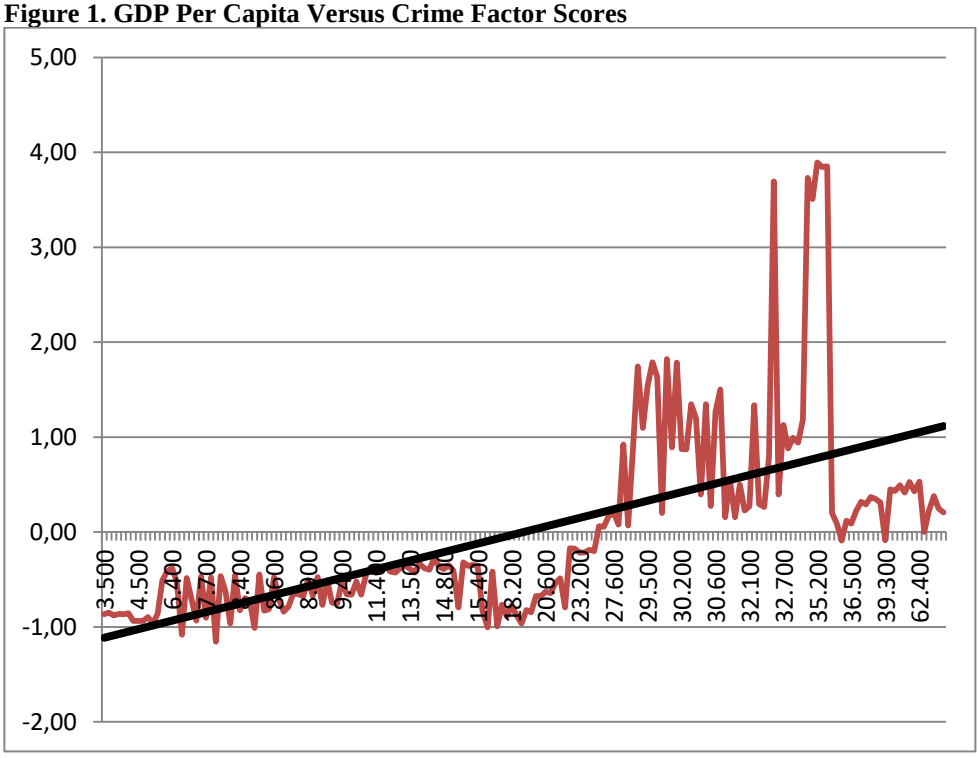

Figure 1 shows the statistically significant relation between GDP per capita as horizontal axis and crime factor scores as vertical axes. We can observe several interesting points in this graph. After the $28,100 per capita income, crime scores increases rapidly also there is a dramatic increase between $34,200 and $35,900. After tha, a dramatic decrease could be observed.

5. Conclusion

Results of this study supports the hypothesis that the economic development while providing wealth for the people, may also create unwanted externalities and moral hazards in the society (Hemley&Pheters, 1975). Advanced economies concentrate people in urban and metropolitan areas and this concentration may lead to increase the opportunities of various types of crimes. The results suggest that sexual assault is the most important component of the crime factor in the EU; rape, assault, theft and intentional homicide follow this crime type respectively. We also observed that, higher levels of migration do not lead to higher crime rates for the EU natios. Another words, there is no any significant relation between them.

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