The Impact of Macroeconomic Indicators on Recidivism in Drug-Related Crimes (1979-2006)

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Abstract

Objective: Due to the growing trend of recidivism in drug-related crimes and the notable contribution of these crimes to the committed crimes, the aim of this study was to investigate crime dimensions, especially the economic dimension of crimes in the field of macro-economic and criminal policy making. **Method:** The relationship of inflation and unemployment with recidivism in drug-related crimes was investigated using inferential and descriptive statistics and ordinary least squares of regression technique during 1979-2006. **Results:** Unemployment and inflation were found to hold a positive relationship with the dependent variable. Unemployment and inflation could explain 16% and 74% of the criterion variable, respectively. **Conclusion:** Therefore, inflation and unemployment are among the economic indicators that can account for 85% of the changes into the recidivism in economic crimes while Gini coefficient, education, and urbanization had no effect on recidivism in economic crimes.

Keywords: recidivism in drug-related crimes, unemployment, inflation, Gini coefficient, per capita income

Introduction

The public security sector is directly related to the extent to which norms and laws are followed, and in contrast to the level of norm violations and offenses. If public security is undermined, the process of development and progress of a society will also be undermined. Apart from cases such as the amount of the committed crimes, the fear of crime and the costs of the criminal and penal system are among the important indicators in the recognition of the status of public security and the situation of recidivism of crimes (Issazadeh, Mehranfar & Mehranfar, 2012). In many countries, the absolute or even relative number of prisoners is increasing over time (Gasson, 1992). Attention to prison, as the main form of punishment, has led to mass incarceration in Iran. From the beginning of 1979 to the end of 2001, a total of 6946443 people entered prisons in Iran, 19% of whom are ex-offenders. Between 2002 and 2006, from among the 3061169 people entering prisons, 30% of the prisoners were ex-offenders that shows a significant increase over the past years (Shams, 2008, A and B). An examination of the available statistics suggests that the continuation of this trend is neither financially nor socially feasible and has many destructive effects. The frequency of the entry of ex-offenders across over the country is presented in the following graph.

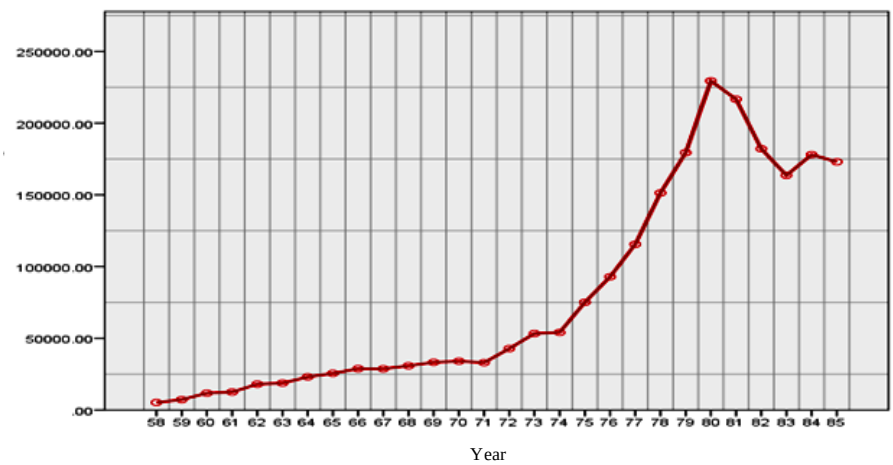

Chart 1: Frequency of the entry of ex-offenders into prison in the whole country (1979-2006)

It is on the society to bear numerous costs by the private and public sectors in order to reduce the crime rate. Obviously, spending a huge amount of money by the government will reduce the share of other costs, such as education, health or civilian life. On the other hand, committing any crime entails spending the labor energy and capital expenditures. Thus, the second part of crime costs is created during the incidence of the crime and, eventually, numerous costs are imposed after the incidence of the crime. The availability of such consequences as a result

of the occurrence of crime has led to the conduct of several studies on the causes of crime and recidivism, especially the economic factors influencing it.

Unemployment has always been the creator of criminal offenses by nature and leads to social exclusion and recidivism, while employment leads to the reinforcement of social ties and increase of informal control over individuals. Employment also leads to the reduction of the time spent with offender peers, reduction of the risk of recidivism, etc. In general pressure theory, it is also believed that the reduction of unemployment-related pressure can be effective in the avoidance of movement towards criminal activities and to the successful integration of the ex-offenders into the society (Fotros, Dalaei Milan & Ghorbanseresht, 2012; Mehregan & Garshasabi, 2011; Garshasbi Fakhr; 2011; Wayman, Stolle and Bushey; 2007; Uggen, Wakefield & Western, 2005; Laub & Sampson; 1993; 2001; 2003; Warr, 1998; Akers; 1979; Agnew, 1992; Grogger, 1998; Ehrlich, 1973). On the other hand, inequality of income and inflation undermine the power of meeting the needs and have caused the emergence of social harm (Issazadeh et al., 2012; Sadeghi, Shahaghi & Asgharpour, 2005; Abbasinejad, Ramezani & Sadeghi, 2012).

It should be noted that the prison creates a series of difficulties for the individual and his/her family and community in the direction of successful reintegration after freedom, one of which is the difficulty in job seeking (Pager, 2003 and 2007; Western, 2006; Visher & Kachnowski, 2007; Abdi, 2002). The mere entrapment in the jail can reduce individual job opportunities by reduced career abilities and past work experience because the person-to-work connections will in fact experience a sharp decline (Sobol, 2007; Western, 2006; Western, Kling & Weiman, 2001; Petersilia, 2005; Travis, 2005; Holzer & Raphael, 2004; and Gill, 1997). Harlow (2003), Petersilia (2005), and Western (2006) believe that the ex-prisoners' ability to successfully achieve a job and occupation and earn a living is dependent upon the economic conditions of a society after freedom as well as upon the individual factors (such as skill levels, education level, work experience, physical and mental health , drug addiction, etc.). For example, if there is an economic downturn after the person's release from prison, the labor market's ability to absorb him/her will be weak.

In addition, economic conditions can indirectly contribute to the successful integration of the offenders released from prison. For example, during periods of economic inflation, the ability of the offenders' families to provide the offender after release from prison with necessary supports will be reduced and, thereby, the probability of the offender's entry into the illicit labor market will increase (Couch & Fairlir, 2010; Hoynes, 2000; Freeman, 1991). All of the aforementioned items indicate that the ex-offenders are more vulnerable to the deterioration of economic conditions than other social groups. However, despite the previous internal and external studies that have found a positive correlation between unemployment and crime rates in the community (e.g., Gharashabi, 2011; Abasinejad, 2012; Issazadeh et al., 2011; and foreign research, such as

Fleisher, 1963; Gary Becker, 1968; Ehrlich, 1973; Lee, 2003). The only foreign research that has explored the relationship between unemployment and recidivism pertains to the one carried out by Raphael & Weiman (2007) wherein a positive correlation has been found between unemployment rate and recidivism. Since recidivism is one of the main challenges of Iran's criminal justice system, the overall aim of this study is to investigate the effect of macroeconomic variables (unemployment, inflation, per capita income, and Gini coefficient) and the control of social variables of education and urbanization on recidivism among drug trafficking prisoners from 1977 to 2006 throughout the country.

It should be noted that the inference test of the theories related to the impact of unemployment on crime in this study is not relevant, since the purpose of this study, as mentioned earlier, is to conduct a macroeconomic analysis of economic factors on the recidivism of drug crimes. Therefore, the only hypothesis derived from previous theories and empirical studies is the impact of unemployment and other economic variables on recidivism in crimes. To be more precise, only drug-related crimes have been investigated in this study due to their high frequency and specific effects and their relationship with addiction. In accordance with article 1 of the Drug Law, passed on October 25, 1988 by the Expediency Council, the group of drug-related crimes includes 21 offense categories that cover the production, importation, and maintenance to the smuggling, distribution, purchase, and sale of narcotic drugs. From 1979 and 2001, about 19% of the revealed crimes pertained to narcotics while and from 2001 and 2006, this value reached 21.23%. The analysis of the crimes directly related to and resulting from drug crimes, it is observed that about 10.22% of the detected crimes pertained to this category of crimes from 1979 to 2001 while this value amounted to 18.19% from 2001 to 2006. Therefore, the drug offenses indirectly related to addiction-related crimes from 1957 to 2001 amount to the 29.22% of the total crimes while this value was 37.19% for all the detected crimes from 2001 to 2006 (Shams, 2009 A and B).

Method

Population, sample, and sampling method

This research is an analytical and descriptive study in which the causal relationships between the variables has been evaluated using descriptive and inferential statistics. In addition, for data collection, the time series data from 1979 to 2006 were used. The reason for this selection was the availability of statistics on the recidivism of drug offenses for this period only. Regarding the dependent variable, the time series statistics pertaining to the recidivism of drug offenses were used that had been reported by the Prisons Organization (see Shams, 2008, A and B). The statistics related to other research variables were

also extracted from the bank's serial data center web site of the Central Bank of Iran (www.cbi.ir), as well as the site of the Center for Statistics of Iran (www.Sci.org.ir).

The analysis of the research data has been done based on regression models using Ordinary Least Squares Regression (OLSR). In this technique of regression calculation, the correlation can efficiently calculate the correlational and causal relationships between a set of variables. This kind of regression is used when there is a linear relationship between the variables (Nayebi, 2013). As it will be seen later, the assumption of the linearity of the variables has been confirmed using the scatterplot. The basic assumption of the linear relationship is the predictive power of a variable on another variable (Habibpour Gottabi & Safari Shali, 2009). In the current research subject, the assumption of the linear regression relationship of economic variables with the dependent variable leads to the revelation of the detection and prediction power of the variations of the dependent variable in the range of current data and its subsequent trends. In addition, MATLAB software was used to perform more advanced statistical calculations to compensate for the limitations of calculating this type of regression and reviewing the details of the fitness of the distribution of the recidivisms of narcotic-related crimes, which cannot be verified by SPSS software.

Results

As it has been shown in Figures 3 and 4, the recidivism rate of drug-related crimes among women is significantly lower than that among men, which is also obviously determined among the prisoners entering prisons. In the period from 1957 to 2001, 95.1 percent of the prisoners entering to prison were men and 4.59 percent were women. From 2002 to 2006, 4.9 percent of these prisoners were women and 95.91 percent were men (Shams, 2008 A and B).

Table 1: The recidivism rate of drug-related crimes and the number of committed crimes by men and women (1979 to 2006)

Year	*Men*						*Women*					
	1	*2*	*3*	*4*	*5*	*>5*	*1*	*2*	*3*	*4*	*5*	*>5*
1979	458	139	87	49	1	0	3	0	0	0	5	0
1980	720	244	124	83	58	195	32	12	2	3	0	6
1981	1556	462	257	162	107	216	88	22	15	7	6	5
1982	1300	452	256	123	80	173	73	15	9	2	5	5
1983	2237	828	397	231	152	320	131	37	9	2	3	4
1984	2334	887	430	273	173	361	198	63	27	9	9	5
1985	2893	1007	620	323	182	339	277	74	18	8	6	4
1986	2950	1124	564	329	197	386	319	80	33	13	10	13
1987	3480	1508	771	458	297	548	353	114	64	17	11	13
1988	3179	1360	856	471	308	596	363	151	68	34	9	20
1989	4551	1147	621	370	239	629	316	139	69	26	14	11

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Year	*Men*						*Women*					
	1	*2*	*3*	*4*	*5*	*>5*	*1*	*2*	*3*	*4*	*5*	*>5*
1990	3107	1335	781	452	310	579	295	129	69	42	20	17
1991	3061	1230	673	349	231	461	360	101	63	37	13	30
1992	3233	1175	581	307	206	448	123	59	28	14	2	12
1993	4028	1961	896	487	298	685	183	69	28	17	14	12
1994	5402	2758	1408	742	495	1157	253	103	45	22	20	41
1995	5028	2366	1144	630	350	965	254	95	49	36	15	32
1996	7276	3126	1332	735	470	976	373	186	77	37	29	42
1997	4846	3683	1631	863	506	2435	394	164	74	6	21	41
1998	11048	4608	1994	1011	564	1111	454	232	106	39	34	37
1999	17829	6632	3431	1913	1292	2473	510	257	141	52	36	57
2000	22005	9096	5073	2821	2061	4050	561	255	148	68	54	63
2001	24175	11893	6822	4147	2906	6241	857	403	225	93	58	119
2002	24546	10594	5793	3448	2405	5454	759	325	162	95	69	95
2003	19215	7977	4332	2472	1660	3772	584	199	125	85	62	83
2004	17229	7473	2982	1325	1527	2545	582	174	113	47	48	86
2005	16422	6623	3878	2232	1503	3753	517	185	130	72	33	83
2006	15926	6437	3580	2109	1396	3798	503	183	83	52	26	59

As it is observed in the above table, the majority of the recidivism rate pertains to one to two items of crimes, and the rates with more two crimes have taken fewer frequencies. Apart from the differences observed in the graphs, it is seen that the recidivism rate of drug offenses among women and men has increased in a relatively stable trend while this increase has taken a higher acceleration from 1996 to 2001, but this recidivism rate has experienced a decreasing trend from 2001 to 2006. At first, the fit model of men and women's rate of recidivism was evaluated separately in order to determine the best fit model (see Table 1) and, then, the explanatory research model was explained and the results were interpreted. The graph of the frequency of narcotic drug offenses among women has been shown below in terms of the number of offenses and crimes between from 1957 to 2006.

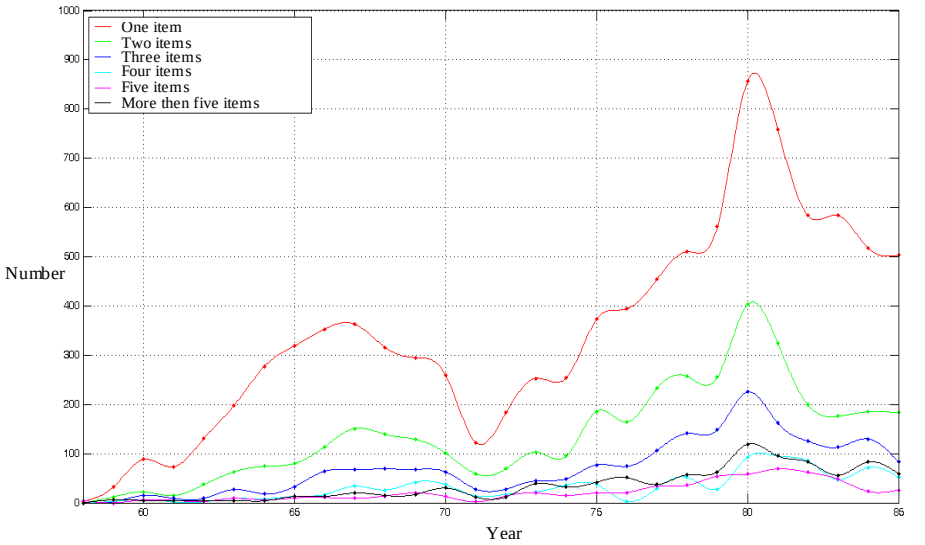

Figure 2: Recidivism rate of drug-related crimes among women based on the number of committed crimes (1957-2006)

The graph of the frequency of narcotic drug offenses among men has been shown below in terms of the number of offenses and crimes between from 1957 to 2006.

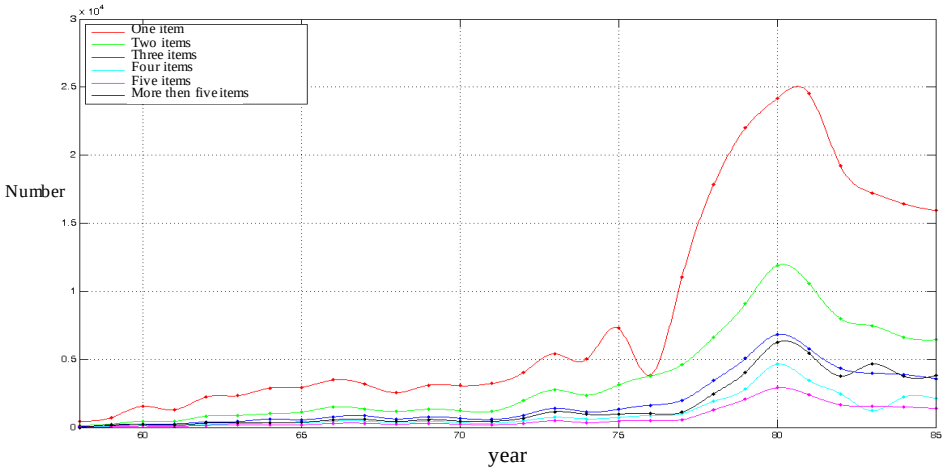

Figure 3: Recidivism rate of drug-related crimes among men based on the number of committed crimes (1957-2006)

The following table shows the R^2 value of the goodness of fit for the functions of the recidivism of drug offenses between 1957 and 2006 in both genders and degree of functions in order to infer the best fit model of drug offense recidivism.

Table 2: R^2 values for genders and degree of functions

Type of fitness	*R^2 value for genders*		
	Female	*Male*	*Female and male*
Polynomial degree 1	0.81	0.79	Under-fitting
Polynomial degree 2	0.80	0.92	0.92
Polynomial degree 3	0.78	0.91	0.91
Polynomial degree 4	Over-fitting	Over-fitting	Over-fitting

As it can be observed, the fourth-grade function is over-fitting for both men and women, which means that the fitted function would well determine the behavior of the data within its range, but it doesn't have the ability to generalize the results in the previous and following ranges. In the same way, it is observed that the first-degree function is under-fitting when the gender criterion is not considered. This means that the function cannot fit well the data scattering model within the range of the current data and the predicted current and past data. Therefore, according to the results obtained from the fitting of the polynomial functions from degrees 1 to 4 in all three criteria (women, men, and total), one can consider an intermediate state between the increase of the degree of function and gender, in which the second-degree function will be the best option to fit the existing data. Figure 4 shows the fitting of the data based on the second-degree function in general (men and women).

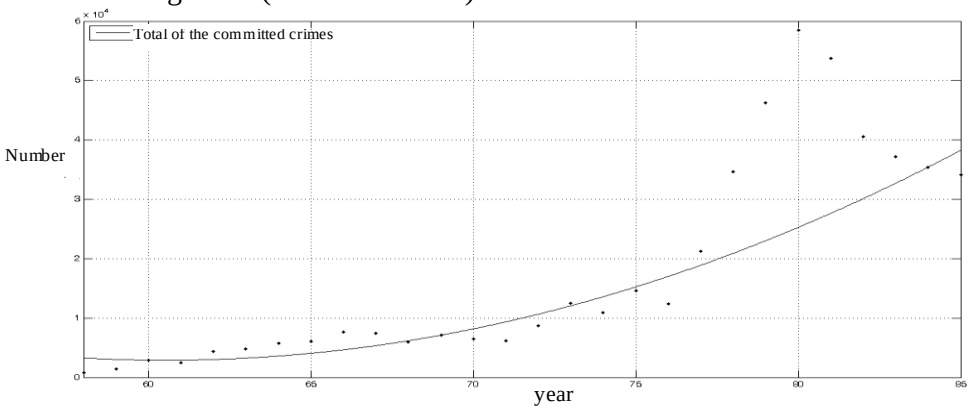

Figure 4: Fitting of the recidivism of drug-related crimes between men and women (1957-2006)

The three-variable fit of crime recidivism, unemployment, and inflation is presented in the following table in order to investigate the effect of the analytical model variables on the dependent variable in the following function.

$f(x, y) = ag^2 + bxy + cy + dx + e$

$f(x, y) = -0.41\, y^2 - 0.0001\, xy + 9.60\, y + 0.002\, x - 54.18$

Table 3. The components of the impact function of the independent variables on the dependent variable

A	The second-degree dependency coefficient of inflation to recidivism	**E**	The linear distance of unemployment and inflation from recidivism
B	Simultaneous dependency coefficient of unemployment and inflation to recidivism	$\mathbf{Y^2}$	The second-degree dependency of inflation on recidivism
C	Simultaneous dependency coefficient of inflation to recidivism	**X**	The linear dependency of unemployment on recidivism
D	Simultaneous dependency coefficient of unemployment to recidivism	**Y**	The linear dependency of inflation on recidivism

The examination of the various degrees of inflation and unemployment revealed that the best fit conditions for modeling the behavior of recidivism is the simultaneous application of linear first-degree functions on unemployment and second-order function on inflation. In this case, the value of R^2 is equal to 85%. However, in other modes, the fitting of the function in higher degrees will face the over-fitting error, which is due to the data limitation and the relatively linear behavior of the unemployment parameter in comparison with recidivism.

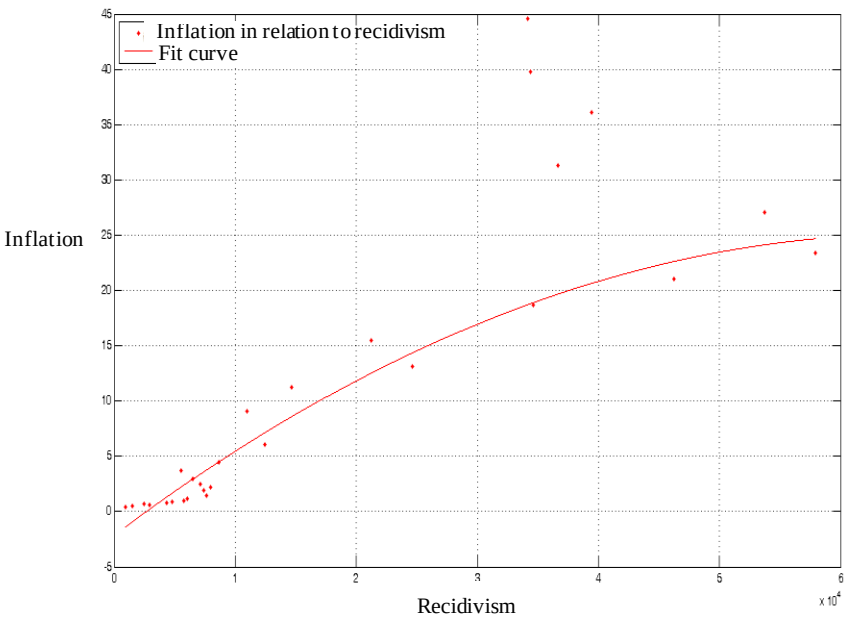

Figure 5: The relationship between unemployment and recidivism of the drug-related crimes (1979-2006)

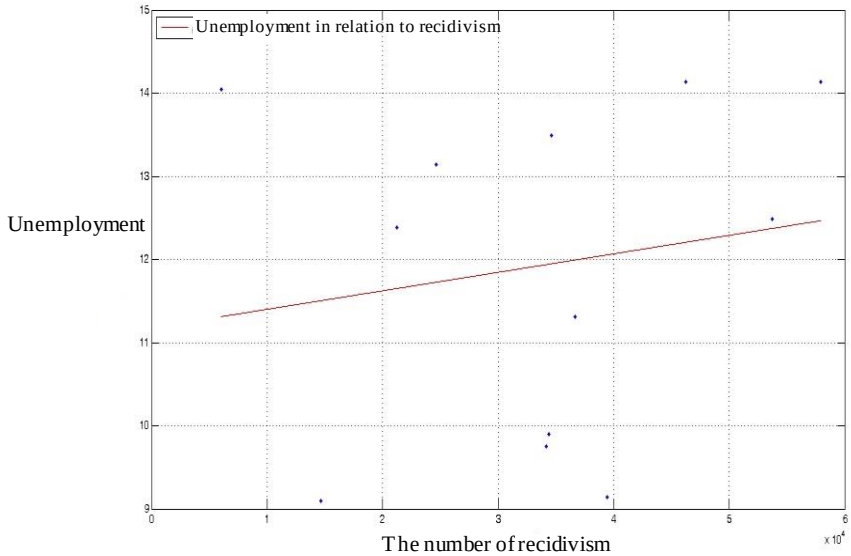

Figure 6: The relationship between inflation and recidivism of the drug-related crimes (1979-2006)

In fact, as shown in Figures 5 and 6, the behavior of each of the parameters of unemployment and inflation is linear ascending in comparison with the recidivism of the crime. In other words, with the increase of each of the parameters of unemployment and inflation, an increase occurs in the recidivism of crimes where the intensity of the effect of the inflation parameter on the recidivism is higher than the unemployment parameter effect on recidivism. Each of the indicators of inflation and unemployment has a direct relationship with the recidivism index, but each of them can independently explain only some part of the variation in the dependent variable. Therefore, each of these variables only models a fraction of the changes in the index of recidivism with a precise and relatively low level, while the simultaneous use of both unemployment and inflation variables in the formation of the equation increases the model's accuracy in the estimation of the recidivism index and an optimal model is obtained. The R^2 value of unemployment with the first-degree model is 16% and the value of this statistic for the inflation variable with the second-degree model is equal to 74%. The following three-dimensional graph shows the variation of the dependent variable simultaneously in relation to the variables of unemployment and recidivism.

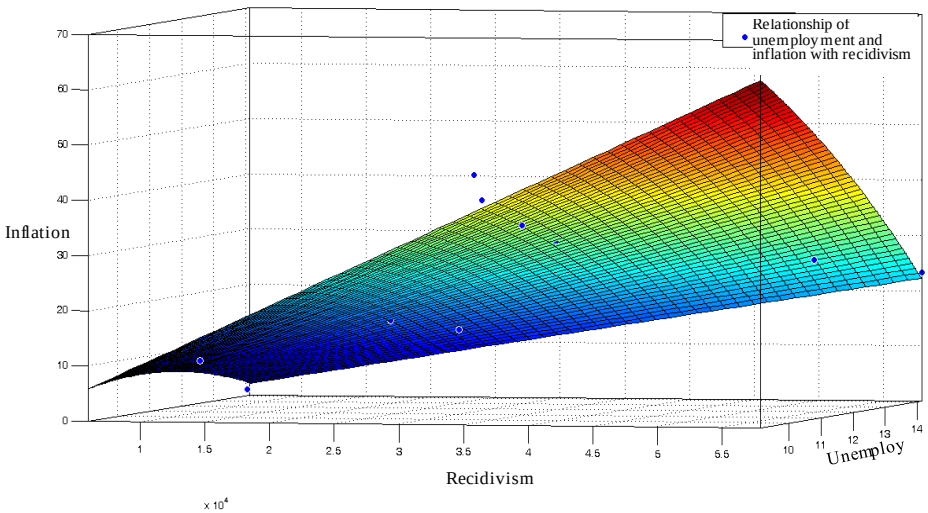

Figure 7: Three-dimensional graph of the relationship of unemployment and inflation with recidivism of drug-related crimes (1957-2006)

Furthermore, the examination of the other control variables in the explanatory model (urbanization, education, Gini coefficient, and per capita income) did not show any significant relationship between the mentioned variables and the index of drug-related recidivism. This state occurs when the R^2 value is negative, which indicates the non-significance of the parameters used in the formation of the model. This can be due to various reasons.

Discussion and Conclusion

Naturally, the amount of recidivism represents the fact that the society has not have the capacity to reclaim the released prisoners as legitimate citizens, and the programs related to reinstatement and return to society in this regard have faced either theoretical and/or practical gaps. The recognition of these gaps and presentation of theoretical and practical suggestions in this area can certainly be more effective, important, and fundamental in multi-institutional policies. In the division of the United Nations (2012), preventive policies related to returning to society and reducing the recidivism of crimes are twofold:

- Social prevention (indirect strategy): creating job opportunities, helping disadvantaged groups and vulnerable families, and paying attention to educational issues
- Provisional prevention: the application of effective punishments and effective official controls

No crime prevention strategy can be effective regardless of the crime recidivism; indeed, any strategy of this type should address the trends and circumstances and the way the crime has been re-committed. Naturally, the

achievement of a result based on a holistic approach that addresses all aspects of recidivism prevention was not among the objectives of this research; in fact, the main aim of this study was to examine the effect of macroeconomic socio-economic variables (unemployment, inflation, per capita income, Gini coefficient, education, and urbanization) on the recidivism of drug offenses by means of the least squares regression technique. From 1957 to 2001, 4.59% of the registered crime recidivism pertained to women and 95.41% of this statistics pertained to men. In addition, from 2001 to 2006, 4.09% of these crime pertained to women and 95.91% of the crimes pertained to men. More specifically, during the years 1385-1380, 4.9% of the repeat offenses related to women and 95.91% were men. More specifically, from 1979 to 2001, a total of 1372299 people involved in drug-related crimes entered prisons in Iran, 5.35% of whom were women and 94.65% of them were men. Between 2002 and 2006, a number of 649794 people have entered prisons, 3.66% of whom were women and 96.34% of them were men.

The investigation of the statistics shows that only unemployment and inflation out of the economic factors have a significant effect on dependent variable. The R^2 value of unemployment was obtained equal to16% and that of inflation was 74%. In total, the analytical model of this study with the sum of unemployment and inflation could explain 85% of variation in dependent variable. In sum, in macroeconomic policies in the field of crimes, this point should be taken into account that the economic parameters and the related fluctuations, especially during the economic downturn, significantly increase the rate of crime recidivism among the released prisoners. Obviously, the findings of this study underscore the importance of post-release services, especially employment services to ex-prisoners.

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