

**Lottery Ticket Sales:
An Empirical Analysis of the Misery Index as a Predictor of Sales**

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Abstract

This study investigates the correlation of lottery ticket sales with the widely cited misery index. The misery index is often used as an indicator of an economy's performance. The misery index was initiated by Chicago economist Robert Barro in the 1970's. In its basic form the misery index is the sum of the unemployment rate and the inflation rate. However, some economists add interest rates as an additional factor. Observers of lotteries often suggest that as the economy worsens people tend to pursue their economic dreams by purchasing more lottery tickets. This paper analyzes the validity of this hypothesis.

With an increasing number of public constituencies relying on the profits of government-sponsored lotteries, the ability to more accurately predict lottery sales would be of great interest. Although the preliminary study findings for a single state (Missouri) indicate that lottery ticket sales are highly correlated to the traditionally measured misery index, a further analysis found that one of the three states reviewed had a slightly lower correlation. Thus, future research is needed to determine if some other factor would be a predictor of lottery sales.

Introduction & Background

In North America every Canadian province, 40 U.S. states, the District of Columbia, Mexico, Puerto Rico, and the U.S. Virgin Islands all offer government operated lotteries. Elsewhere in the world lotteries operate in over 100 countries on every inhabited continent. Total sales for U. S. lotteries in 2003 exceeded \$44 billion. While there is much controversy regarding the benefits and drawbacks of government sponsored lotteries, recent studies indicate that 57 percent of American adults have purchased a lottery ticket in the last 12 months. Proceeds from government sponsored lotteries provide a stream of revenues to a wide range of beneficiaries, including educational scholarships, quality of life programs, and general funds.

What drives lottery ticket sales is a much discussed topic within lottery managers and lottery vendors. Many feel that it is driven by a combination of game design, advertising, prize payout, competition, income levels, discretionary income, etc. This study takes a simpler approach and considers whether sales might be driven by the misery index. Some feel that the poor are the primary lottery players. It might be expected that as the economy worsens, unemployment rises and/or inflation increases. That is, if the misery index increases, then

lottery sales should increase. Therefore we chose to compare lottery sales to the misery index to determine if there is a correlation.

Methodology

To assess the relationship between lottery sales in the states surrounding Arkansas and the misery index, lottery sales data for Texas, Missouri, and Louisiana were extracted from the North American Association of State and Provincial Lotteries (NASPL) database and U.S. inflation and unemployment rates were taken from the *2003 Economic Report of the President*. Annual lottery sales figures for Missouri were available for the period from 1986 through 2003. For Texas, figures were available for the period from 1992 through 2003. Sales figures for Louisiana were available for the period from 1991 through 2003. The lottery sales figures were adjusted for inflation using inflation rates computed from the consumer price index series using current methods that were introduced in June 1999. The adjusted lottery sales figures for these states were then analyzed descriptively and correlated with the misery index. Finally, simple linear regression analysis was performed for each state with adjusted lottery sales as the dependent variable and the misery index as the independent variable.

Results & Conclusion

Table 1 includes the descriptive statistics for adjusted lottery sales and the misery index. Table 2 displays the correlation matrix for the Louisiana, Missouri and Texas adjusted lottery sales and the misery index. The correlation coefficient, representing the relationship between the misery index and Louisiana lottery sales, is .139 with an associated significance probability of .651. The coefficient for the Missouri lottery sales is -.742 with an associated significance probability of .000. The coefficient for the Texas lottery sales is -.214 with an associated probability of .501. Only the Missouri-sales/misery-index coefficient is significant and negative as expected.

Table 1. Adjusted Lottery Sales and Misery Index Statistics

	Years	Minimum Sales	Maximum Sales	Mean Sales	Std. Deviation
Louisiana	13	\$123,516,510	\$373,839,638	\$241,933,504	\$74,300,423
Missouri	18	\$142,920,585	\$435,016,955	\$265,603,290	\$84,259,868
Texas	12	\$780,673,355	\$2,447,320,002	\$1,864,870,348	\$441,260,991
Misery Index	18	6.06	11.01	8.84	1.59

Table 2. Lottery Sales and Misery Index Correlations Matrix

		Misery Index
Misery Index	Pearson Correlation	1.000
	Years	18
Louisiana	Pearson Correlation	.139
	Years	13

Missouri	Pearson Correlation	* -.742
	Years	18
Texas	Pearson Correlation	-.214
	Years	12

* - Correlation is significant at the 0.01 level (2-tailed).

The regression analysis is presented in Tables 3; it includes results associated with the adjusted lottery sales as the dependent variable and the misery index as the independent variable. The results indicate that variation in Louisiana lottery sales is not sufficiently explained by variation in the misery index. The standardized beta is not significantly different from zero. The misery index cannot, therefore, be used to predict Louisiana lottery sales.

The Missouri sales figures are significantly and negatively related to the misery index. The coefficient of determination (R Square) is .55 indicating that 55% of the variation in Missouri sales is explained by the variation in the misery index. The standardized beta (-.742) is significant at the .000 level indicating that the misery index is a good predictor of Missouri lottery sales.

The results of the Texas lottery sales and misery index regression indicate that variation in Texas lottery sales is not sufficiently explained by variation in the misery index. The standardized beta (-.214) is not significantly different from zero (p-value = .504). The misery index cannot, therefore, be used to predict Texas lottery sales.

Table 3. Regression Analysis for Lottery Sales

State	Beta	t-value	Sig
Louisiana	.139	.466	.651
Missouri	-.742	-4.423	.000
Texas	-.214	-.692	.504

Based on the results of the study of these three states, it is not possible to conclude that the misery index is a good indicator of lottery sales for all states. Louisiana has many other forms of gambling available in many parts of the state which perhaps impacts on these results. Further complicating the results is the fact that Missouri has riverboat gambling available in some areas, but not to the extent of Louisiana, which probably impacts the level of lottery sales in a negative manner. Texas has had gaming available on Indian reservations in the past, but it has been discontinued, Texas has also had prize payouts severely limited by legislative action in the past. All of these things in addition to game design, advertising, etc. may have impacted sales in these states.

These three states represent only 8% of the total U.S. state lotteries so it would be premature to conclude that the misery index is absolutely not a predictor of lottery sales. Additional analysis will need to be completed to determine if the misery index is an indicator of lottery sales in the U.S or perhaps other factors are indeed the driver for lottery sales. However, these preliminary results contradict those that would believe that lotteries benefit when the economy worsens.

Biography

Ms Clark has been with Henderson State University (HSU) since 2003. Ms. Clark teaches a variety of courses in information systems in the School of Business. Prior to coming to HSU Ms. Clark taught at the Dona Ana Branch of New Mexico State University. She has extensive experience in web-based teaching tools along with practical experience as a former vice-president for the New Mexico Lottery. Ms. Clark earned a BS and BA at the University of Missouri and her Masters of Business Administration at New Mexico State University.

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