FRIDAY NIGHT LIGHTS, MONDAY MORNING GROWTH: THE IMPACT OF SUCCESSFUL HIGH SCHOOL FOOTBALL TEAMS ON LOCAL ECONOMIC DEVELOPMENT

Rex J. Pjesky, West Texas A&M University

ABSTRACT

This paper investigates the relationship between the success of high school football teams and the economic success of small communities. Using a sample of 34 small towns from the Texas Panhandle, there is evidence that success on the football field is positively related to short term economic growth for two years. However, evidence for a long-term relationship is weak. *JEL Classifications: H71, R11, R51Key Words: State and Local Taxation, Rural Economic Development, Small High School Sports*

INTRODUDCTION

High school football is an important institution in rural American culture. The Friday night football game is the big event in town. The team is expected to win. If the team wins, the coaches and players are elevated to hero status. If the team loses, the kids are failures and there are calls for the coach's job. The hopes and aspirations of the community seem to rise and fall with the win/loss record of the football team. Even Hollywood acknowledges this with movies like "Friday Night Lights," "Varsity Blues," and "The Best of Times."

But does a team's record make any difference? Does the community pride that follows a winning football team create a winning community? It has been shown that mood can have a significant impact on economic outcomes. Edmans, Garcia, and Norli (2007) show that asset prices (as measured by stock returns) in a country go down following elimination from the world cup, indicating that economic processes can be impacted by non-economic events which affect the mood of the people.

There is no question that rural America is struggling to maintain economic viability. Small towns are drying up; their populations dwindling as the old pass away and the young seek better opportunities elsewhere. Yet some towns do better than others. There must be some (perhaps many) factors that determine the viability of small communities. The author of this study hypothesizes community pride, as proxied by the performance of the football team each fall, could be a key factor in explaining the economic performance of a community.

To test this hypothesis, data from small (population 1,000 to 5,000) towns in the Texas panhandle was analyzed to measure the impact that wins by the high school's football team had on economic activity. Small towns, rather than larger areas, were selected because it is likely the community pride that appears from a winning high school sports team is a much more important factor in community

development and vitality in a small town relative to a large town. Also, small towns have much simpler economies and there is a greater chance that an analysis that focuses on just one factor will have meaning.

BACKGROUND

There is a rich literature on the relationship between sports and local economies from many viewpoints. One part of this literature concerns the desirability of having the public finance sports facilities, with the general conclusion being that public financing of stadiums is not a good idea (Sutter, 2000). Baade and Dye (1988) created an early survey of the literature that casts doubt on the ability of cities to use the creation of new sports stadia with taxpayer money to spur development.

A second avenue of related literature looks at the impact of sports franchises on local economies. Many of these studies suggest that the existence of a sports franchise does not impact a local economy at all. Coats and Humphreys (1999) use panel data to study a broad range of events (such as the building of arenas and stadia, and entry and exit of sports franchises) concerning the sporting environment in a large cross section of cities in the United States and found that sports did not have a positive impact on per capita income growth. Indeed, some sports franchises might actually reduce the level of per capita income in a community. Lertwachara and Cochran (2007) published a study echoing that conclusion finding that professional sports franchises in baseball, football, basketball, and hockey lower per capita personal income in both the short and long run.

However, the conclusion that sports franchises and stadiums have little or even negative impact on larger cities is far from a consensus in the academic literature. Gius and Johnson (2001) find cities having multiple professional sports franchises have higher per capita income relative to cities with one or no professional sports franchises.

Most of these studies attempt to assess the impact of sports on large metropolitan areas. It is not surprising that studies investigating the impact of sports in a large city find sports have little or no impact on the area's economy. Large cities have many sources of income and opportunities for growth. Disentangling the complex economies to isolate the impact of sports on large cities might be difficult for econometric methods.

Research on the impact of sports on small, rural areas is much scarcer. This paper focuses on a different size of community that does not have a large diverse base of income generating activities in hopes of finding a connection between successful sports franchises and economic activity.

DATA

One of the challenges for researchers in the area of rural economic development is a suitable measure of economic activity. Employment data is generally reported at the county level. Income data can be found at the county and zip-code level, but these geographical coverage areas are generally not appropriate for the study of small, rural communities, as they cover larger areas than are usually of interest (Rogers, 2002). Therefore researchers must find alternative measures.

Using data on retail sales is a suitable alternative measure for approximating the economic activity and vitality of a small community. Because of the way local

options sales taxes are collected, researchers can calculate the exact magnitude of a community's retail sales tax base.

Local option sales taxes (LOSTs) are usually collected along with state and county sales taxes by the state from individual retailers at the point of sale (POS). The money due to local governments is then sent back to the local community. Because of this system, the retail sales base in a community can be figured with precision.

To calculate the retail sales tax base, one must divide the total taxes collected by the rate at which the government taxed the sales base. For example, if a community collected 1 million in LOSTs and had a tax rate of 1 percent, the total retail sales tax base would be 100 million.

Even with the accuracy of the data, there are some issues. A problem arises when the tax rates change. Sometimes, state or local rates change, often in the middle of the reporting period. When this happens, there is no way to calculate the exact amount of retail sales for the period. Therefore, the years in which the local or state tax rate changed were excluded from the sample.

Data were available from 1985-2007 from the State of Texas' comptroller's website for each community's retail sales tax collections and tax rate. From this information, the retail sales tax base can be easily calculated.

The second vital piece of data needed for this study is the records of high school football teams. Texas football is organized into different divisions. The smallest division, made up of the smallest schools, plays six man football. Larger schools play football in the traditional 11 man format. Within each division (based on school size) schools are subdivided into different districts, which are based on geography. Schools typically play 10 regular season games, with the top two teams in each district advancing into a sudden death playoff system with the possibility of playing at least six more games if the teams reach the state championship for their respective division.

The University Interscholastic League, based at the University of Texas, Austin provides the records of every 11 man high school team in Texas up to the year 2000. This data base does not include the records of schools that played six-man football, so any community with a football team in the six-man category during the duration of this study is excluded. Since this study focuses on smaller communities, only teams in the 1A and 2A divisions were included. This excluded all towns in the sample with populations exceeding approximately 5,000. There were 34 towns in the Texas Panhandle that are associated with high school football teams appropriate for this study.

So, due to data availably and the selection process of the football teams, this study will focus on 34 towns in the Texas Panhandle that have football teams that play in the 1A and 2A divisions. The time period will from 1985-2000. This creates a cross-sectional, time-series data set with 34 units spanning 16 years.

METHODOLOGY

If football success matters to economic success, the number of wins a team earns this year and in past years should be correlated with a town's economic success. In principle, that relationship can be modeled with the following equation:

$$Y_{c,t} = \alpha + \beta_0 X_{c,t} + \beta_1 X_{c,t-1} + \beta_2 X_{c,t-2} + \ldots + \beta_k X_{c,t-k} + u_{c,t} \quad (1)$$

Where $Y_{c,t}$ is the level of retail sales;
X is the number of wins;
c is the 34 communities that play 1A or 2A football in the Texas Panhandle;
t is 1985-2000.

Equation one is a distributed lag with a finite number of lags. Such a model can be easily estimated with OLS to estimate the relationship between the lagged right hand side variables and the left hand side variable.

This approach, however, is *ad hoc* and its estimation will almost surely be complicated with enough statistical problems to cast doubt on the results (Gujarati, 1995). The main problem is there is no *a priori* notion of what the lag structure of length should be. Fortunately, there are alternatives. Almon (1965) suggests a distributive lag model one can use with regression techniques.

Gujarati (1995) fully explains the Almon approach. Almon's idea rests on the notion that the β_i's in equation (1) can be approximated by a polynomial in i, with the degree of the polynomial determined by the relationship of the distributed lags to the dependent variable.

The attractiveness of Almon's approach is that one can use any number of lags necessary and can specify the relationship between the lags in the X variables and the Y variable by using different degree polynomials. Following the suggestion and the procedure of Davidson and MacKinnon (1993), the degree of the polynomial and the number of lags for the Almon procedure was selected before the final estimation was done. Selecting the number of lags is important, because the model needs to be correctly specified to reflect the "true" amount of time the relationship between the variables lingers or the model will suffer from either omitted variable bias or a bias resulting from including too many variables.

Davidson and MacKinnon's suggestion for determining the length of the lag is to begin with an equation that has many lags and then, one by one, take the lags away until one finds the equation that fits best. The best fit is determined by maximizing the Schwarz criterion.

To select the correct degree of polynomial to use one should theorize what the lag structure looks like. For this problem, it was expected that any impact resulting from a winning football team will have a parabolic shape, that is only one maximum. For this data, a second degree polynomial and three lags were used. Substitution of the polynomial approximations for the β_i's in equation (1) yields:

$$Y_{c,t} = \alpha + a_0 \sum_{i=0}^{k} X_{c,t-i} + a_1 \sum_{i=0}^{k} i X_{c,t-i} + a_2 \sum_{i=0}^{k} i^2 X_{c,t-i} + u_{c,t} \quad (2)$$

$i = 0, 1, 2, 3$

Where $Y_{c,t}$ is the level of retail sales for community c and year t;
$X_{c,t}$ is the number of wins for community c and year t;
c equals 1 to 34 and t equals 1985 to 2000.

Then, define

$$Z_{0c,t} = \sum_{i=0}^{k} X_{c,t-i}$$

$$Z_{1c,t} = \sum_{i=0}^{k} iX_{c,t-i}$$

$$Z_{2c,t} = \sum_{i=0}^{k} i^2 X_{c,t-i}$$

where $k = 3$, the number of lags deemed appropriate given the data and c, t, and i are defined above.

This results in an equation that can finally be estimated properly by standard regression techniques. That equation is:

$$Y_{t,c} = \alpha + a_0 Z_{0t,c} + a_1 Z_{1t,c} + a2 Z_{2t,c} + \boldsymbol{\beta_{3t}} \boldsymbol{T} + \boldsymbol{\beta_{4c}} \boldsymbol{C} + \varepsilon_{t,c} \quad (3)$$

$Y_{t,c}$ is retail sales in the selected communities from 1985-2000;
$Z_{0t,c}$, $Z_{1t,c}$, and $Z_{2t,c}$ are defined above;
$\boldsymbol{T}$ is a vector of dummy variables for each year in the sample;
$\boldsymbol{C}$ is a vector of dummy variables for each community in the sample.

Given that the data suggest (since there are only 3 lagged time periods used in the Almon approach) any effect that a successful football team will not have a lasting effect on a community's development, a second model will be estimated to try to estimate any lingering effects of a successful football team on the economic viability of a town.

In this second model, the data is split into two sections of eight years for each town. The left hand side variable will be the percentage growth in retail sales from 1993-2000 (the second half of the study period.) On the right hand side will be three variables: The total number of wins a community's football team accumulated from 1985-1992 (the first half of the study), the distance from the community to the nearest large city (either Lubbock or Amarillo) and that same distance squared.

$$Y_{c,(1993\text{-}2000)} = \alpha + \beta_1 X_{1c(1985\text{-}1992)} + \beta_2 X_{2c} + \beta_3 X_{2c}^{\,2} + \varepsilon \quad (4)$$

$Y_{c,(1993\text{-}2000)}$ = the percentage growth in retail sales in community c from 1993-2000;
$X_{1c,(1985\text{-}1992)}$ = the number of wins by community c's football team from 1985-1992;
X_{2c} = the distance between community c and the nearest Texas metro area.

The purpose of this equation is to see if a large number of wins in an early period is correlated with larger growth in retail sales in a later time period. The distance variables are included as a "fixed effect" that controls for other factors that might be important for the health of a community as proxied by the distance of the town to its nearest large neighbor.

RESULTS

Table one gives the results of the Almon estimation of equation (3). A fixed effects model with an assumed AR(1) process and robust standard errors is used to correct for the possibility of autocorrelation and heteroscedasticity. The coefficients

on the fixed time and community effects are omitted from the table. The coefficients and the standard errors of the Z variables have been converted into their meaningful X counterparts. The results in table one suggest that winning is positively correlated with economic activity, as measured by retail sales.

The marginal impact of one additional win in a season is associated with an increase in retail sales of $62,153 in the current year. The t-stat of 0.943 suggests that this association is not significant. A win in the previous year's season is associated with an increase in retail sales of $124,471. The t-stat of 1.89 suggests that this relationship is significant at the α=0.10 level (the p-value is 0.061). A win two years in the past is estimated to have a marginal impact of $153,490 on the current year's retail sales. The t-statistic for this relationship is 2.31, suggesting a high degree of confidence (the p-value is 0.022) that a positive relationship does exist. Finally, a win three years in the past is estimated to have an impact of $49,313 on the current year's retail sales. The t-statistic for this relationship is only 0.673, casting doubt on the significance of the relationship.

TABLE ONE
RELATIONSHIP BETWEEN RETAIL SALES A ND LAGGED WINS

VARIABLES	ESTIMATES
Constant	$22,994,791 (101.1) [0.000]
Wins in Year t	$62,153 (0.943) [0.347]
Wins in Year t-1	$124,471 (1.89) [0.061]
Wins in Year t-2	$153,490 (2.31) [0.022]
Wins in Year t-3	$49,313 (0.673) [0.502]
Observations	417

T-stats in parentheses
P-values in brackets

The results suggest a significant positive relationship between success by a community's football team and economic success. Indeed, success in the past two years seems to impact the community's retail sales to a great extent. However, that relationship seems to be very short lived as the coefficients shrink and become insignificant after only two lags.

To try to gain insight into the presence of a longer-term relationship, equation (4) is estimated to determine if there is any relationship between sustained success on the football field (as measured by summing the number of wins over an

extended time period) and sustained success in economic development (as measured by growth in retail sales.) Table two gives the results.

TABLE TWO
RELATIONSHIP BETWEEN GROWTH (1993-2000)
AND WINS (1985-1992)

VARIABLE	ESTIMATE
Constant	-0.0654 (-0.27) [0.792]
Wins 1985-1992	0.00273 (1.56) [0.129]
Distance to Nearest Large City	0.00666 (0.96) [0.346]
Squared Distance to Nearest Large City	-0.0000582 (-1.26) [0.218]
Adj R^2	.0544
Observations	34

T-Statistics in parentheses
P-Values are in brackets

As demonstrated by the positive coefficient of 0.00272, an additional win over the eight year time period (1985-1992) resulted in a slightly faster growth in retail sales (0.273%) in the later time period (1993-2000). However, this relationship is not significant at either the 5% or the 10% level (its p-value is 0.129) so it is not possible to conclude the positive relationship is true with a high degree of statistical certainty. In other words, it is not possible to reject the null hypothesis that there is no relationship between wins in the early period and the rate of growth in retail sales in the later period.

CONCLUSION

The relationship between community pride in its local sports team and the economic success of a community is an interesting one. Conventional wisdom would almost certainly be that the relationship is positive, with successful high school sports providing an engine of growth and development for smaller towns.

This paper provides weak evidence that the conventional wisdom is true. The results of model one suggest that football success has a significant short term impact of the development of small communities. Specifically, model one suggests a winning football team increases economic activity in a small town 2 years after success of the football team.

The results of the estimation of equation (4) suggested there was no relationship between sports success and economic success. The positive coefficient on the wins variable in equation (4) implies that towns with more wins by the football team in the first half of the period grew at a faster rate in the second half of the time period; however the estimate is only significant at a 13% level of certainty. Therefore, the null hypothesis that winning high school football teams do not foster economic activity in small communities cannot be rejected.

As stated in the introduction, this study focused on small towns as opposed to larger towns because one should more easily find a relationship between a winning sports franchise and economic vitality in smaller towns due to their simpler economies. Large cities are very complex and isolating the effect of a single factor on economic activity proves difficult, as apparent in the literature. But there is no reason that the mechanism that relates community pride to economic development through successful sports teams would not work in a similar or identical way in larger economies. If that is true, the result of this paper, that winning on the field at best creates short term economic benefits for small towns, could be transferred to larger cities.

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