THE BALLPARK IN ARLINGTON:

AN ECONOMIC IMPACT STUDY

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This study examines the fiscal impact the Ballpark in Arlington has on the City of Arlington. Many individuals argue that the new Ballpark in Arlington would create numerous new jobs and bring added economic development to the city, thus increasing sales tax revenues.

An interrupted time-series approach was used to determine whether or not the new ballpark has a measurable impact on retail sales tax receipts in the City of Arlington. Based on sales tax rebate data obtained from the Texas Comptroller's Office, the study found no significant increase in sales tax receipts for Arlington during the baseball season. However, this is not to say that the Ballpark in Arlington has no impact on total local economic activity. These findings do call into question, as other studies have, the relative fiscal value of publicly-sponsored professional sports venues

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CHAPTER 1

INTRODUCTION

The Public Funding Of Sports Stadiums

Cities across the United States are facing the pressure to upgrade or construct new sports facilities in order to maintain their status as upper tier communities. These new facilities, which cost well upwards of 200 million dollars, are being financed by all levels of government. The subsidy begins with the federal government granting state and local governments the opportunity to issue tax exempt bonds to help finance the stadiums. On the state level, subsidies are handed out as relief for corporate taxes and abatements. Finally, the local subsidy can take the from of a dedicated sales tax for the new project and can also entail other giveaways that include streets and utilities. This study will explore the overall economic impact of the Ballpark in Arlington by studying the increase of sales tax revenue generated from the voter approved half cent sales tax increase.

One of the main rationales to subsidize sports facilities is revealed in a time honored slogan ,Build the Stadium--create the Jobs (Noll 1)! In addition, in order to win voter approval of the tax increases, politictions and team owners promise that new businesses will arrive and that existing busnesses will expand. Many citizens ask the question, why contribute millions to the wealthy, when they can finance the project

themselves? The response often given is that the public will benefit greatly in job creation and economic development.

Why Cities Subsidize Sports

Proponents of publicly financed stadiums argue that sports facilities improve the local economy in four ways. First, building the facility creates many local construction jobs. Second, people who attend games or work for the team generate new spending in the community. Third, a team attracts tourists and companies to the host city. Finally, all this new spending has a multiplier effect as increased local income causes still more new spending and job creation. Team owners and local politicians argue that new stadiums spur so much economic growth that they are self-financing due to ticket taxes, sales taxes on concessions, other visitor spending from outside the stadium, and property tax increases arising from ancillary development. Unfortunately, these arguments contain poor economic reasoning leading to an overstatement of the benefits of stadiums and ultimately misleading the public. True economic growth occurs when a community's resources--people, capital, and natural resources-- become more productive. Increased productivity can arise in two ways; from economically beneficial specialization by the community for the purpose of trading with other regions or from local value added that is higher than other uses of local workers, land, and investments(Noll 30). Building a mega dollar stadium is good for the local economy only if a stadium is the most productive way to make capital investments and use its workers. Yet, cities tend to ignore the economic

aspects of stadium financing and rely more on the social and psychological signifigance of sports (Noll 25).

A sports stadium can spur economic growth if sports is a significant export industry--that is, if it attracts outsiders to buy the local product and if it results in the sale of certain rights (broadcasting, product licensing) to national firms (Noll 18). In addition, if a stadium is located within the confines of an urban center, then this new venue can be a keystone component. This urban revitalization will likely not occur if the sports team is unwilling to share in the financing of new construction.

Cities also assist in the financing of stadiums out of fear of losing existing teams. Team owners will force a city into building a new stadium or arena by threatening to leave and go to an area that is willing to pay the subsidy. Some cites refuse to knuckle under such pressure, such as Houston when the Houston Oliers wanted a bigger stadium. Houston Mayor, Bob Lanier, in testimony before Congress in 1995 spoke of the problems confronted by a city dealing with a sports team that demands a new stadium from a city:

> The real demand is for luxury boxes, not more seats. So the average working person is asked to put a tax on their home or pay sales or some other consumer tax to build luxury boxes in which they cannot afford to sit. Frequently, the new stadium is smaller. The working person is asked to be satisfied with the sense of pride they get from the arrangement, which will last until another team bids more for their players, or until another city bids for the team. In Houston, we have chosen the priorities of our youth program, but we do not think we should have been forced to do so (Baade 78).

Unlike Houston, most cities fail to take sound economic advice and fall victim to economic blackmail from professional team sports. Their rationale is that if the subsidies are not granted then the teams will leave for other cities.

When the economic arguments fail to win voters over, many team owners, community leaders and politicians make an impassioned pleas for sports. Such pleas for the approval of a new stadium almost always focuses on the culture of sports and how sports are important to the human condition. James Michener, makes such an impassioned plea:

> [A] city needs a big public stadium because that's on e of the things that distinguishes a city. I would not elect to live in a city that did not have a spacious public building in which to play games, and as a tax payer I would be willing to have the city use my dollars to help build such a stadium, it were necessary. I am therefore unequivocally in support of public stadiums. . . . I believe that each era of civilization generates its peculiar architectural symbol, and that this acquires a spiritual significance far beyond its mere utilitarian purpose (338).

For Michener, a large stadiums represents a distinguishing achievement which will enhance a cities cultural and spiritual reputation for many years to come (Rosentraub 1996, 30).

Certainly, sports and their arenas are important to American culture. For example, the city of Dallas used the world wide success of the Dallas Cowboys durng the late 1960s and early 1970s to move forward in the wake of the Kennedy assasination. Before the success of the Cowboys and certainly after the assasination, Dallas was known as a city of hate. One can argue that the City of Dallas might have recovered without the

Dallas Cowboys being America's Team; however, it is widely believed in most circles, that the Dallas area recovered a lot quicker with the huge success of the Cowboys.

Another argument that is used to promote the public financing of sports stadia is that professional sports teams help improve local quality of life. A closer look at why companies move would reveal that education, transportation, infrastructure, tax policies, and access to markets are the main reasons for a relocation. For example, the cities of Plano and Richardson have been successful in recent years in attracting corporations despite the fact that neither has a professional team.

A final reason that cities have a willingness to finance new stadiums is the promise of more jobs. The Federal Employment Act of 1946, which articulated the government's intent to provide employment for all able and willing workers, started the American concept of full employment (Baade, 1997, 98). This philosophy has permeated the American thought to a point that few question a rationale for public expenditures based on a projects job creation potential (Baade, 1997, 98). Baade also makes the argument that replacing an existing stadium only relocates the work place, leaving the work force all but unchanged except for a few high level management jobs (1997, 98).

The City of Arlington

The city of Arlington, Texas, lies between Dallas and Ft. Worth and is a few miles south of DFW Airport. With a population of over 300,000 citizens, Arlington is the thrid largest city in the DFW Metroplex. For several decades, the city has tried to base its economic development on sports and recreation (Rosentruab 45). Such

entertainment magnets as Six Flags Over Texas and the water park, Hurricane Harbor, provides Arlington several avenues to attract visitors.

Yet, Arlington's economy is as diverse as it is grounded in entertainment. The General Motors plant in the city has provided thousands of jobs for several decades. In addition, The University of Texas at Arlington is one of the largest second tier schools in Texas. These large and diverse economic strong points gives the city a unique position in the search for growth and development.

The History of The Texas Rangers

In 1972, Arlington mayor, Tom Vandergriff, persuaded the Washington Senators baseball team to leave Washington D.C. for Texas. The new Texas Rangers would begin play in 1973 and play in the old Turnpike Stadium, an old minor league stadium. The minor league stadium was upgraded in the late 1970s and its name changed to Arlington Stadium. The team struggled financially every year and several owners attempted to be competitive with one of the lowest payrolls in the major leagues.

In the 1980s, free agency began to escalate player's salaries and baseball owners struggled to meet the demand for the elite athletes. The new stadiums built in the late1970s and 1980s began to have luxury and corporate suites installed. These suites or boxes were controlled exclusively by the team owners and their representatives and subject sharing arrangements with other teams. The teams fortunate enough to have these boxes were able to increase their payrolls, and in theory, have better teams. Arlington Stadium, however, did not have a single luxury box in its upgraded condition. Furthermore, at least a third of the seats in Arlington Stadium were in the outfield and

were inexpensive to the consumer. This unfavorable revenue flow caused the Ranger baseball team to fall further behind the elite teams of the east and west coasts.

During the late 1980s a financial group headed up by Rusty Rose and George W. Bush, purchased the Texas Rangers from oil man Eddie Chiles for $86 million . George Bush paid $650,00.00 for a 1.8 percentage share of the team and was named managing partner. With George Bush as a figure head owner and the cash of Rusty Rose, the Rangers started to plan for a bigger ballpark that would provide the correct number of luxury suites and higher end seats.

The new ownership of the Texas Rangers went to the voters in Arlington in 1991 with a plan to build a new ballpark next to Arlington Stadium. The voters were asked to approve a 1/2 cent increase in the local sales tax rate that would provide a total of $135 million to the total cost of $195 million cost of construction. Voters approved the new sales tax and construction commenced with completion scheduled in time for the 1994 season. In January of 1998, Tom Hicks, the owner of the Dallas Stars, purchased the Rangers for an estimated $250 million , with this increase in team value largely attributed to the new Ballpark.

CHAPTER 2

LITERATURE REVIEW

A large portion of the research findings for the last two decades concerning public subsidies for sports arenas is negative. The proponents of subsidies for sports venues, including politicians and team owners, claim that the subsidies are needed to promote the welfare of the area and keep existing teams in place. These supporters claim that the subsidies will in the long run provide more jobs and economic diversity. On the other hand, opponents of team subsidies believe that such hand outs to the team owners are poor economic planning and corporate welfare.

Mark Rosentraub, is the leader of the opposition towards the public financing of sports stadiums and arenas. In his book Major League Losers, Rosentraub claims that subsidies to team owners are little more than hand outs to the rich (4). He further claims that an organized system of welfare to the rich is taking place across this country when new stadiums and arenas are built (3). Rosentraub believes that this welfare system exists because local and state political leaders are "blinded by the promises of economic growth, mesmerized by visions of enhanced images of their communities , and captivated by a mythology of the importance of sports" (3).

Robert Baade, has published extensively on the subject of financial incentives for stadiums. Like Rosentraub, Baade claims that most stadiums deals do not benefit a community enough to take the financial risk of raising taxes. Baade's main argument is

that the jobs promised by stadiums proponents are not capable of supporting families and are seasonal in nature (Noll 99). Baade also claims that the new stadiums attract a large amount of revenue from outside the stadium's neighborhood, but a huge amount of this revenue goes into the pockets of the owners and players (Badde 1996, 3). With the advent of the contemporary stadium, Baade explains that a new project might detract from an urban economic development plan rather than add to it. Since the new style of ballpark attempts to obtain every last source of revenue, from culinary options and souvenirs to child care, the neighborhood busnesses are left behind (Baade, 1996, 3).

Roger Noll and Andrew Zimbalist, in their book Sports, Jobs, and Taxes, go into great detail in covering the opportunity costs of financing a stadium with public funds. They argue that:

> Because of the significance opportunity costs, a public investment should be evaluated in terms of the best alternative way to use the same resources. The presence of unemployment may be a legitimate rationale for a public investment program, but it is not a rationale for building a stadium, rather than making some other public investment. In order for the stadium to be the best choice, it must generate net benefits that exceed alternative uses. The opportunity forgone in building a stadium is not the cost of the stadium, but the benefits from the other ways this money could be spent 62).

In addition, Noll and Zimbalist question the validity of the multiplier effect in relationship to professional sports. They contend that a professional team's contribution to the total economy is small and is hard to quantify without looking at the team's internal accounting figures (Noll 73).

In his book, Playing The Field, Charles Euchner takes to task the large economic multiplier effect that many proponents of incentives claim occur when new stadiums are built. Euchner believes that such multipliers are inflated and add little to the projection of a cities economic development (70-71). Like Michener, Euchner believes that cities are symbols and are important because symbols help people find there way through a confusing world (168). Euchner claims that a notable symbol of a city is a professional sports team, because it enhances civic pride" (168). Even Mark Rosentraub believes that sports is too important a part of western society for us to think that cities can exist without teams and the events which define essential dimensions of our society and life (Rosentraub, 1996, 29).

Unlike most economists, Thomas Chema believes that economic incentives work in professional sports stadiums. Chema takes issue with the concept that most of the jobs created in a new stadium are low wage and seasonal. He makes the argument that a strong economic plan calls for a variety of skills and wage levels (Chema 21). In accordance with most economists, Chema also believes that a new sports stadium should be built in an urban setting to obtain the best results (Chema 22).

CHAPTER 3

THE CASE FOR SUBSIDIES

There is strong support in this country to provide economic incentives for organizations to stay in place and move into a community. Obviously most politicians and team owners are in full and enthusiastic support of incentives that will improve their bottom lines. These incentives range from tax relief and abatements to vast infrastructure improvements; such as new access roads, water, and sewage treatment for little or no cost. The main argument for such incentives rests upon the theory that if the incentives are not given, then the organization will seek a location that can offer a better economic deal. Corporations, like sports teams, realize the pressure that can be placed upon a local community to offer incentives to stay and many take full advantage of the situation.

A further reason to offer incentives for a new stadium is the promise of more jobs for the local community. The former mayor of Arlington, Richard Greene, was quoted in The Ft. Worth Star Telegram on June, 25 1990, expounding the creation of new jobs the new Ballpark in Arlington will create hundreds and maybe thousands of new jobs within the city of Arlington and surrounding area. The type of promised new jobs were lost in the rhetoric of details of trying to win the sales tax referendum. Greene further promised that the new Ballpark would bring in new businesses that would be centered in and around the surrounding area of the stadium. These new businesses would provide the

City of Arlington with a much larger tax base, and in return, the city would be able to benefit from the early retirement of the debt for the new ballpark.

In a response to Robert Baade's attack on economic incentives, Thomas Chema believes that the cities of the future will need to create a critical mass of opportunities for those individuals living in a large metropolitan area (19). Chema points out that cities such as Cleveland, Baltimore, Indianapolis, and Minneapolis have been successful in integrating an urban climate for strategic growth (20). In addition, Chema points out that a sports venue should be placed in an urban setting to obtain the full economic development benefits (20). He states that spin-off development or collateral development will occur if a ballpark or arena is located so that thousands of people will have the opportunity to enter the entertainment area in a concentrated time frame 20). Chema also disagrees that a community should not offer incentives to a team because the teams and players will disburse their economic profits away from the local economy. He asserts that such companies as auto plants and steel mills will disburse profits away from the local economy also (21). Finally, Chema argues that the low wage and skilled jobs offered by a new arena are needed within the urban community to provide a diverse mixture of job types (21).

Another supporter of government subsidies for stadia, Darius Irani, explains that a stadium can be successful if the consumer surplus is greater than the variable costs of the project. Irani defines consumer surplus as the difference between what the sports fan would be willing to pay for a sporting event versus what the fan actually pay (Irani 241). Irani does not fully explain how such a consumer surplus benefits a city that has provided

a lot of tax dollars for the team owners to build a new stadium. However, Irani does admit that the methods of financing a new stadium raises important equity issues. Because new stadiums are financed by sales taxes and sin taxes low income individuals will pay a disproportional share of the subsidies (251).

Richard Alm, a sports economist columnist for the Dallas Morning News, claims in a January 16, 1999 article that the Ballpark in Arlington is a huge financial success for the team and city. Alm states that the Texas Rangers produced $121.4 million in economic activity for Arlington. In addition, Alm claims that the bonds taken out to pay for the new stadium will be paid off much earlier than expected. The $121,4 million notwithstanding, Alm admits that the big winners in the Ballpark in Arlington are the team owners. Ac cording to information from the Texas Rangers Rangers the value of the team went from $88 million when Rose and Bush bought the team, to $250 million dollars when Tom Hicks purchased the Rangers.

CHAPTER 4

THE CASE AGAINST INCENTIVES.

In his book, Major League Losers, Mark Rosentraub believes that sports are an integral part of US and Canadian societies by "providing entertainment, opportunities for countless discussions and debates, an escape from the demands of daily life, and possible economic gains" (448). Rosentraub also recognizes that professional sports teams promote community spirit and help establish an identify for many regions and people (448). However, Roesntraub warns that governmental enntities should be very carefull when considering subsidies for professional teams (449).

One of the major issues that Rosentraub has with giving subsidies to professional sports teams is that taxes are used to improve the welfare of the rich. He reasons that while Arlington has had success in paying off the debt of financing the new ballpark, the sales taxes provided by the lower-income people produce the profits distributed to the wealthy owners and players (447). Although the increase of a half cent to the sales tax is small, Rosentraub explains that it is still "welfare in a state that abhors life on the dole; it is a subsidy in a state that defends capitalism and the spirit of the free market system"(447). Rosentraub asks whether it is time for communities to see if "other investments (schools, public safety, family recreation, and so on) could make a city major league and produce the same level of tangible benefits that the intangible benefit of teams seem to be" (447).

Rosentraub believes that the only way a subsidized stadium will have a small chance to work is that it must be built in an urban area (1994 236). A good example of how a city can be almost successful is Indianapolis. Even when a stadium is built within a downtown area, Rosentraub argues that it is still a bad choice for the taxpayer (1994, 236). According to Rosentraub, a city should develop an economic development program focuses on a communities natural economic advantage inherent to the area (1994, 238).

Any analysis of the impact of a stadium or professional sports team should consider the opportunities a city loses by using subsidies. The question should not be whether a new ballpark has a net impact on economic development, but rather if it has the largest impact on the area from a set of alternative development projects (Baade, 1996, 6). The impact should be measured for its long term ramifications, rather than short term entertainment values and emotional ties. Baade states that an economic development strategy which concentrates on these types of jobs could lead to a situation where the city gains a comparative advantage in unskilled and seasonal labor (1996 7). For the city of Arlington's case, one could argue that the city has enough jobs that are seasonal and low skill with Six Flags over Texas and the water park, Hurricane Harbor.

CHAPTER 5

RESEARCH METHODS

The success or failure of an economic development plan for a community can only be measured over an extended length of time. A plan that is not allowed to provide a long range picture is of little use to a community. There are many evaluation methods to measure the success of an economic development plan; including, real estate values, job creation, income, and sales tax increases. The sales tax is a good tool to measure the economic growth and activity in a community. Furthermore, the sales tax information is readily understood and easy to obtain..

An interrupted time-series model was used to determine whether or not the Ballpark in Arlington had an effect on the retail sales tax in the city of Arlington. The first model presented were multiple observations with one interruption is shown below:

01 O2 03 04 05 X 06 07 08 09 010

X = interruption: the new ballpark

O = quarterly sales tax information

A second times-series was performed using the 2nd and 3rd quarters as observations and the 1st and last quarters as the interruption

O1 O2 X X 03 04 X 05 06 X X

X = interruption, the new ballpark

O = quarterly sales tax information

The Autoregressive integrated moving average (ARIMA, or Box-Jenkins) models was used on the Arlington Retail sales Tax time-series. The Box-Jenkins model is designed to permit unbiased estimates of the error in a series (Cook and Campbell 235). In addition, the Box-Jenkins model is designed to make a time-series stationary. According to Cook and Campbell, most time-series have secular trends and thus are nonstationary. A nonstationary time-series must be made stationary by differencing the series.

Cook and Campbell explain that there are several threats to internal validity in a time-series experiment. First, there is a possibility of a maturation effect or an upward rise before the intervention. They claim that a time-series experiment can asses the maturation effect prior to the intervention where other experiments cannot (Cook and Campbell 209). Second, a cyclical trend can masquerade as a treatment effect. A time-series can delete the cyclical trend by assessing the pre-intervention data and allowing the possibility of a regression alternative explanation of the findings (Cook and Campbell 211). The cyclical patterns in a time-series experiment must be displayed where the cyclical variation had been removed and the series is expressed as deviation from an expected cyclical pattern (Cook and Campbell 213). A final threat to internal validity, and the most common form, is the main effect of history-the possibility of forces other

than the treatment under investigation came to influence the dependent variable immediately prior to or after this modeled intrusion (Cook 211).

The archival data collected for this experiment were in quarterly intervals instead of monthly or weekly intervals. Due to the dynamic nature of collecting taxes, the quarterly totals changed weekly in the most recent months. While the small incremental changes in the data did not invalidate the experiment, finding the most accurate count became problematic. This issue was addressed by constantly changing the data set when new information was available.

CHAPTER 6

RESEARCH FINDINGS

The NCSS 2000 statistical program was used to obtain a time-series analysis of the sales tax information gathered from the Texas Comptrollers office. The model formulated for the experiment is:

Model----------Regular (0,1,0) Seasonal (2,1,0)

Trend Equation---------(2.245024E+08) + (7307719) X(date)

In the ARIMA Report, (Appendix A) the model estimation section shows that the parameter estimates are within the bounds set out by Cook and Campbell (251). In addition, the t values show to be significant for this particular model. The autocorrelation chart of the residuals show that the model is stationary. Finally, the Portmanteau test value describes an adequate model.

A regression model was issued using the using the residuals from the ARIMA model as the independent variable and the intrusion of the first year of the new Ballpark in Arlington as the dependent variable. The null hypothesis for this experiment is that the construction of the new Ballpark in Arlington did not have an effect on the overall sales tax collections. The Multiple Regression Report (Annex B), does not indicate that the ballpark in Arlington had a significant effect on the sales tax collection at the 95% confidence level. A second regression equation was obtained using the 2nd and 3rd quarters as the interruption. Again, the regression reports demonstrates that the new

Ballpark in Arlington did not have a significant impact on the sales tax, even in the months that the Texas Rangers were playing.

A comparison between the increase of sales tax between the cities of Arlington and Plano was also developed. The comparison was made between the 1st and 2nd quarters and 2nd and 3rd quarters.

	1st to 2nd	2nd to3rd	Overall
Arlington	9.1%	7.7%	64%
Plano	13.6%	2.2%	19%

From January 1986 to December of 1999 the city of Arlington had a 64 percent increase in retail sales tax collections, while the city of Plano had only a 19 percent increase. The city of Plano had a weak increase from the 2nd to 3rd and Arlington had a slight drop from the 2nd to 3rd. An argument could be made that the Ballpark in Arlington helped maintain the citie's economy along with the other strong summer entertainment busnesses.

CHAPTER 7

CONCLUSION

The time-series data does not indicate that the introduction of the new stadium in Arlington, Texas has had significant effect on the retail sales tax revenues. These findings do not, however, prove that the Ballpark in Arlington has no impact on the city. In fact, the final comparison numbers indicate that the economy of Arlington has grown a great deal and the Ballpark in Arlington, as well as the other entertainment attractions, contribute to the economic well being of the city. The city of Arlington certainly could have used the half cent increase in the sale tax for other more justifiable economic development plans. For example, the city could have instituted a job training program in the high-tech field and provided more jobs at a lower cost. The city might have forced the Texas Rangers to move to another location by refusing to finance the new ballpark, but the city would have lost a lot of intangible benefits from having a major league baseball team.

Without the Texas Rangers, the City of Arlington's economy might not have grown at such a high rate. Arlington, with its vast concentrations of tourism and heavy manufacturing, could survive without professional baseball. Certainly the Rangers could have stayed in the old Arlington Stadium, but the escalation of players salaries forced the team into reconfiguring their income. A refurbished Arlington stadium, with the addition of luxury boxes, would have cost the taxes payers a lot less and solved their income

problems. While the sales tax did not have a significant rise due to the construction of the new Ballpark in Arlington, the value of the team did increase and the new owner of the Texas Rangers will reap the corporate welfare benefits provided by the voters.

APPENDIX A

Appendix A

ARIMA Report

Page/Date/Time 1 06-29-2000 18:33:58
Database A:\thesis.S0
Variable Arlington_Retail_2-TREND

Minimization Phase Section

Itn No.	Error Sum of Squares	Lambda	SAR(1)	SAR(2)	
0	1.441263E+16	0.01	0.1	0.1	
1	1.040699E+16	0.01	-0.3972545		-0.2911453

Normal convergence.

Model Description Section
Series Arlington_Retail_2-TREND
Model Regular(0,1,0) Seasonal(2,1,0) Seasons = 4
Trend Equation (2.245956E+08)+(7305511)x(date)

Observations	56
Iterations	1
Pseudo R-Squared	98.808883
Residual Sum of Squares	1.040699E+16
Mean Square Error	2.123876E+14
Root Mean Square	1.457352E+07

Model Estimation Section

Parameter Name	Parameter Estimate	Standard Error	T-Value	Prob Level
SAR(1)	-0.3972545	0.1367723	-2.9045	0.003678
SAR(2)	-0.2911453	0.1328671	-2.1913	0.028434

Asymptotic Correlation Matrix of Parameters

	SAR(1)	SAR(2)
SAR(1)	1.000000	0.000000
SAR(2)	0.000000	1.000000

ARIMA Report
Page/Date/Time 2 06-29-2000 18:33:58
Database A:\thesis.S0
Variable Arlington_Retail_2-TREND

Forecast Section of Arlington_Retail_2

Row	Date	Actual	Residual	Forecast	Lower 95%	Limit Upper 95%
1	1987 1	244253205.00	-5743653.56	249996858.56	209601854.61	290391862.51
2	1987 2	268740480.00	-4732010.09	273472490.09	233077486.14	313867494.04
3	1987 3	264721889.00	-2611062.57	267332951.57	226937947.62	307727955.52
4	1987 4	298618234.00	-4297568.76	302915802.76	262520798.81	343310806.71
5	1988 1	231528591.00	886861.68	230641729.32	190246725.37	271036733.27
6	1988 2	266602802.00	8335112.15	258267689.85	217872685.90	298662693.80
7	1988 3	272265785.00	8223907.10	264041877.90	223646873.95	304436881.84
8	1988 4	303228009.00	-4276104.32	307504113.32	267109109.37	347899117.27
9	1989 1	255425859.00	18517710.29	236908148.71	196513144.76	277303152.65
10	1989 2	292574918.00	4880208.10	287694709.90	247299705.95	328089713.85
11	1989 3	292797557.00	-2252900.43	295050457.43	254655453.48	335445461.38
12	1989 4	347165472.00	20595458.39	326570013.61	286175009.66	366965017.56
13	1990 1	262494121.00	-28312686.89	290806807.89	250411803.94	331201811.84
14	1990 2	306191207.00	10454606.00	295736601.00	255341597.05	336131604.95
15	1990 3	311395091.00	5638788.51	305756302.49	265361298.54	346151306.44
16	1990 4	363288354.00	5969107.97	357319246.03	316924242.08	397714249.98
17	1991 1	291452507.00	3804511.40	287647995.60	247252991.65	328042999.55
18	1991 2	336295297.00	4351019.19	331944277.81	291549273.86	372339281.76
19	1991 3	346028612.00	4924322.42	341104289.58	300709285.63	381499293.53
20	1991 4	396777824.00	4687338.69	392090485.31	351695481.37	432485489.26
21	1992 1	315972761.00	-14604548.17	330577309.17	290182305.22	370972313.12
22	1992 2	364205473.00	5751485.14	358453987.86	318058983.91	398848991.81
23	1992 3	367036903.00	-3652282.35	370689185.35	330294181.40	411084189.30
24	1992 4	428944085.00	9983007.40	418961077.60	378566073.66	459356081.55
25	1993 1	352469024.00	4503937.13	347965086.87	307570082.92	388360090.82
26	1993 2	409441512.00	10420003.98	399021508.02	358626504.07	439416511.97
27	1993 3	420315724.00	6619699.73	413696024.27	373301020.32	454091028.21
28	1993 4	499005242.00	20881804.44	478123437.56	437728433.61	518518441.50
29	1994 1	393734526.00	-29686887.17	423421413.17	383026409.22	463816417.12
30	1994 2	442396056.00	-3852083.14	446248139.14	405853135.19	486643143.09
31	1994 3	456900570.00	4815881.94	452084688.06	411689684.11	492479692.01
32	1994 4	548456575.00	22781935.23	525674639.77	485279635.82	566069643.71
33	1995 1	439407041.00	-13957361.12	453364402.12	412969398.17	493759406.07
34	1995 2	502006948.00	13181356.22	488825591.78	448430587.83	529220595.73
35	1995 3	514462781.00	1735090.65	512727690.35	472332686.40	553122694.30
36	1995 4	582211606.00	-13809812.73	596021418.73	555626414.78	636416422.68
37	1996 1	501855325.00	18808381.86	483046943.14	442651939.19	523441947.09
38	1996 2	538980241.00	-22357604.52	561337845.52	520942841.57	601732849.47
39	1996 3	516944519.00	-34248457.43	551192976.43	510797972.48	591587980.38
40	1996 4	583602909.00	-6801926.88	590404835.88	550009831.93	630799839.83
41	1997 1	478055316.00	-14892973.92	492948289.92	452553285.97	533343293.86
42	1997 2	545885010.00	24642816.45	521242193.55	480847189.60	561637197.50
43	1997 3	545807716.00	7660039.74	538147676.26	497752672.31	578542680.21
44	1997 4	620310561.00	479926.94	619830634.06	579435630.11	660225638.01
45	1998 1	485902407.00	-30514017.42	516416424.42	476021420.47	556811428.37

46	1998 2	568778744.00	19827330.21	548951413.79	508556409.84	589346417.74
47	1998 3	567415672.00	-2604747.42	570020419.42	529625415.47	610415423.37
48	1998 4	631943240.00	-7176507.16	639119747.16	598724743.21	679514751.11

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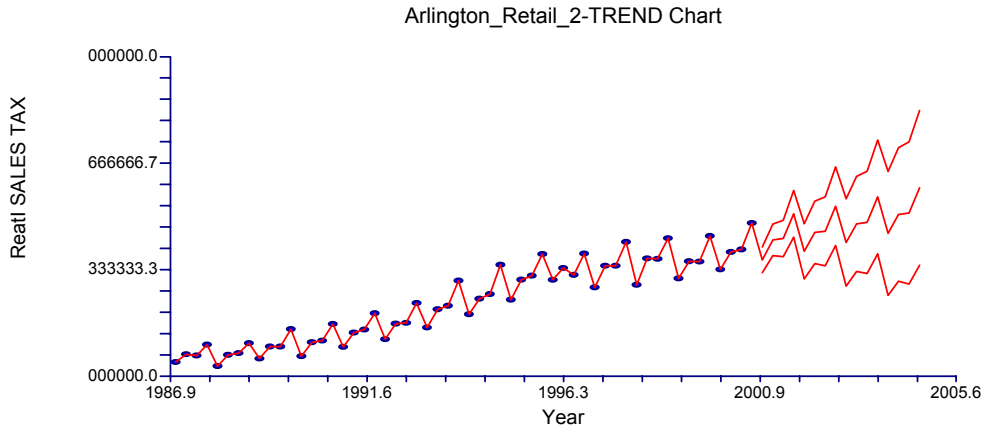
Variable Arlington_Retail_2-TREND

Forecast Section of Arlington_Retail_2

Row	Date	Actual	Residual	Forecast	Lower 95%	Upper 95%
49	1999 1	505912903.00	-10421501.30	516334404.30	475939400.35	556729408.25
50	1999 2	559688521.00	-14183821.85	573872342.85	533477338.90	614267346.80
51	1999 3	558901741.00	6458603.42	552443137.58	512048133.63	592838141.53
52	1999 4	638660979.00	13552822.58	625108156.42	584713152.47	665503160.37
53	2000 1	534365465.00	16660332.40	517705132.60	477310128.65	558100136.55
54	2000 2	588663208.00	-6657506.81	595320714.81	554925710.86	635715718.76
55	2000 3	596832100.00	8810258.39	588021841.61	547626837.66	628416845.56
56	2000 4	679632656.00	6187912.30	673444743.70	633049739.75	713839747.65
57	2001 1		564263724.56	523868720.61	604658728.50	
58	2001 2		626826587.80	577353013.88	676300161.71	
59	2001 3		631270014.35	574142851.92	688397176.79	
60	2001 4		708427764.48	635220285.28	781635243.68	
61	2002 1		591129806.69	504786553.73	677473059.66	
62	2002 2		650257299.73	552528186.08	747986413.38	
63	2002 3		653573282.54	545652932.39	761493632.69	
64	2002 4		732087197.18	609001667.61	855172726.75	
65	2003 1		618779526.87	482202467.29	755356586.44	
66	2003 2		676865385.40	528014658.79	825716112.02	
67	2003 3		681713901.93	521527184.55	841900619.31	
68	2003 4		761331950.40	583420354.45	939243546.35	
69	2004 1		647000747.44	452976812.01	841024682.87	
70	2004 2		706500591.73	497603394.37	915397789.10	
71	2004 3		711068552.30	488288861.54	933848243.06	
72	2004 4		789853137.79	547729047.76	1031977227.81	

Forecast and Data Plot



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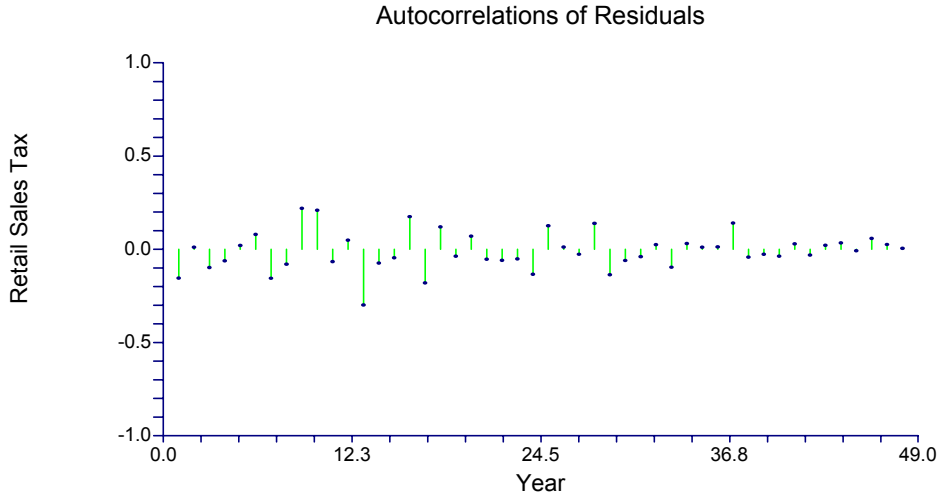
Variable Arlington_Retail_2-TREND

Autocorrelations of Residuals of Arlington_Retail_2-TREND

Lag	Correlation	Lag	Correlation	Lag	Correlation	Lag	Correlation
1	-0.154853	13	-0.299396	25	0.125778	37	0.140120
2	0.010724	14	-0.074529	26	0.011237	38	-0.042857
3	-0.098704	15	-0.046347	27	-0.027607	39	-0.027333
4	-0.062312	16	0.174161	28	0.138569	40	-0.037363
5	0.020237	17	-0.180307	29	-0.137112	41	0.028477
6	0.079246	18	0.119228	30	-0.061108	42	-0.031496
7	-0.156337	19	-0.037747	31	-0.040415	43	0.021024
8	-0.080405	20	0.070234	32	0.024384	44	0.033704
9	0.218935	21	-0.053962	33	-0.097047	45	-0.007822
10	0.208756	22	-0.059935	34	0.030696	46	0.057774
11	-0.066712	23	-0.051836	35	0.010601	47	0.024843
12	0.048155	24	-0.134400	36	0.012085	48	0.004777

Significant if |Correlation|> 0.267261

Autocorrelation Plot Section



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Variable Arlington_Retail_2-TREND

Portmanteau Test Section Arlington_Retail_2-TREND

Lag	DF	Portmanteau Test Value	Prob Level	Decision (0.05)
3	1	2.02	0.155233	Adequate Model
4	2	2.26	0.322617	Adequate Model
5	3	2.29	0.514697	Adequate Model
6	4	2.70	0.609809	Adequate Model
7	5	4.32	0.504776	Adequate Model
8	6	4.75	0.575708	Adequate Model
9	7	8.07	0.326758	Adequate Model
10	8	11.14	0.193691	Adequate Model
11	9	11.46	0.245183	Adequate Model
12	10	11.64	0.310151	Adequate Model
13	11	18.41	0.072608	Adequate Model
14	12	18.84	0.092554	Adequate Model
15	13	19.01	0.122900	Adequate Model
16	14	21.47	0.090191	Adequate Model
17	15	24.18	0.062146	Adequate Model
18	16	25.39	0.063204	Adequate Model
19	17	25.52	0.083717	Adequate Model
20	18	25.96	0.100624	Adequate Model
21	19	26.23	0.123841	Adequate Model
22	20	26.58	0.147631	Adequate Model
23	21	26.84	0.176209	Adequate Model
24	22	28.67	0.154420	Adequate Model
25	23	30.33	0.140132	Adequate Model
26	24	30.34	0.173588	Adequate Model
27	25	30.43	0.208588	Adequate Model
28	26	32.66	0.172270	Adequate Model
29	27	34.92	0.140930	Adequate Model
30	28	35.39	0.158924	Adequate Model
31	29	35.60	0.185582	Adequate Model
32	30	35.68	0.218804	Adequate Model
33	31	37.01	0.211228	Adequate Model
34	32	37.15	0.243773	Adequate Model
35	33	37.16	0.283026	Adequate Model
36	34	37.19	0.324366	Adequate Model
37	35	40.54	0.239031	Adequate Model
38	36	40.88	0.264870	Adequate Model
39	37	41.02	0.298687	Adequate Model
40	38	41.30	0.328388	Adequate Model
41	39	41.48	0.363166	Adequate Model
42	40	41.71	0.396406	Adequate Model
43	41	41.82	0.435117	Adequate Model
44	42	42.13	0.465528	Adequate Model
45	43	42.14	0.508318	Adequate Model
46	44	43.23	0.504601	Adequate Model

47	45	43.45	0.537712	Adequate Model
48	46	43.46	0.579241	Adequate Model

APPENDIX B

Appendix B
Multiple Regression Report Ballpark Intrusion

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Dependent C5
Regression Equation Section

Independent Variable	Regression Coefficient	Standard Error	T-Value (Ho: B=0)	Prob Level	Decision (5%)	Power (5%)
Intercept	636881.2	2217383	0.2872	0.775	Accept Ho	0.059156
intrus1	-431813.4	4354854	0.0992	0.921	Accept Ho	0.051086

R-Squared 0.000189
Regression Coefficient Section

Variable	Coefficient	Error	95% C.L. Coefficient	95% C.L. Coefficient	
Intercept	636881.2	2217383	-3812624	5086386	0.0000
intrus1	-431813.4	4354854	-9170467	8306841	0.0137

T-Critical 2.006647

Analysis of Variance Section

Source	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power 5%
Intercept	1	1.487975E+13	1.487975E+13			
Model	1	1.933689E+12	1.933689E+12	0.0098	0.9213950	.051086
Error	52	1.022692E+16	1.966715E+14			
Total(Adjusted)	53	1.022885E+16	1.929972E+14			

Root Mean Square Error	1.402396E+07	R-Squared	0.0002
Mean of Dependent	524929.6	Adj R-Squared	0.0000
Coefficient of Variation	26.71589	Press Value	1.109519E+16
Sum |Press Residuals	6.074856E+08	Press R-Squared	-0.0847

Normality Tests Section

Assumption	Value	Probability	Decision(5%)
Skewness	-1.7791	0.075231	Accepted
Kurtosis	0.4818	0.629983	Accepted
Omnibus	3.3971	0 .182948	Accepted

Serial-Correlation Section

Lag	Correlation	Lag	Correlation	Lag	Correlation
1	-0.158563	9	0.199701	17	-0.144929
2	0.001726	10	0.228649	18	0.114725
3	-0.122453	11	-0.053163	19	-0.033992
4	-0.077642	12	0.040515	20	0.082947
5	0.025646	13	-0.326816	21	-0.060355
6	0.098647	14	-0.074300	22	-0.060181
7	-0.151576	15	-0.033031	23	-0.057037
8	-0.074566	16	0.207207	24	-0.147005

Above serial Correlations significant if their absolute values are greater than 0.27216
Durbin-Watson Value 2.3086

Multiple Regression Report

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Dependent C5

Multicollinearity Section

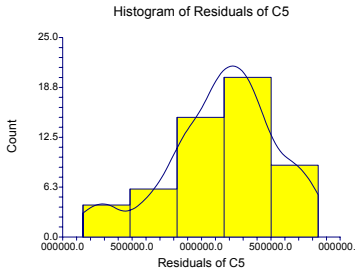
Independent Variable	Variance Inflation	R-Squared Vs Other X's	Tolerance	Diagonal of X'X Inverse
intrus1	1.000000	0.000000	1.000000	9.642857E-02

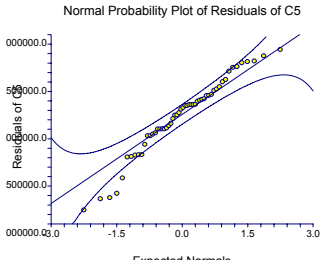
Eigenvalues of Centered Correlations

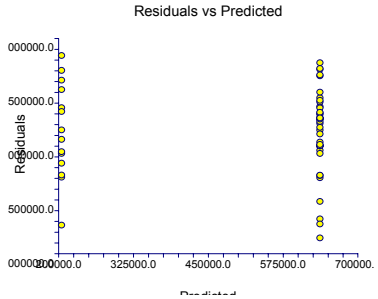
No.	Eigenvalue	Incremental Percent	Cumulative Percent	Condition Number
1	1.000000	100.00	100.00	1.00

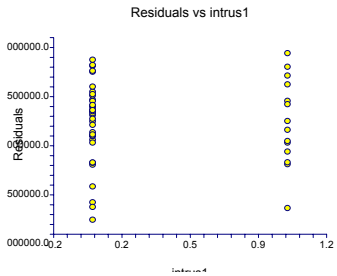
All Condition Numbers less than 100. Multicollinearity is NOT a problem.

Plots Section









Multiple Regression Report 2nd and 3rd Quarters Intrusion
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Dependent C5

Regression Equation Section

Independent Variable	Regression Coefficient	Standard Error	T-Value (Ho: B=0)	Prob Level	Decision (5%
Intercept	-145121.3	2029455	-0.0715	0.943268	Accept Ho
C14	5168964	5636730	0.9170	0.363369	Accept Ho
R-Squared	0.015914				

Regression Coefficient Section

Independent Variable	Regression Coefficient	Standard Error	Lower 95% C.L.	Upper 5% C.L.	Standardized Coefficient
Intercept	-145121.3	2029455	-4217520	3927278	0.0000
C14	5168964	5636730	-6141963	1.647989E07	0.1262
T-Critical	2.006647				

Analysis of Variance Section

Source	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power 5%	(5%)
Intercept	1	1.487975E+13	1.487975E+13				
Model	1	1.62783E+14	1.62783E+14	0.8409	0.3633690	.146734	
Error	52	1.006607E+16	1.935783E+14				
Total(Adjusted)	53	1.022885E+16	1.929972E+14				

Root Mean Square Error	1.391324E+07	R-Squared	0.0159
Mean of Dependent	524929.6	Adj R-Squared	0.0000
Coefficient of Variation	26.50497	Press Value	1.088179E+16
Sum |Press Residuals	6.084731E+08	Press R-Squared	-0.0638

Normality Tests Section

Assumption	Value	Probability	Decision(5%)
Skewness	-1.8024	0.071477	Accepted
Kurtosis	0.2503	0.802393	Accepted
Omnibus	3.3114	0.190959	Accepted

Serial-Correlation Section

Lag	Correlation	Lag	Correlation	Lag	Correlation
1	-0.156024	9	0.209599	17	-0.144365
2	0.043584	10	0.222101	18	0.118043
3	-0.079504	11	-0.045336	19	-0.064978
4	-0.051312	12	0.057573	20	0.069041
5	0.038399	13	-0.301598	21	-0.037915
6	0.126546	14	-0.072140	22	-0.068327
7	-0.112677	15	-0.036128	23	-0.080682
8	-0.060871	16	0.207554	24	-0.161540

Above serial Correlations significant if their absolute values are greater than 0.272166
Durbin-Watson Value 2.2955

Multiple Regression Report
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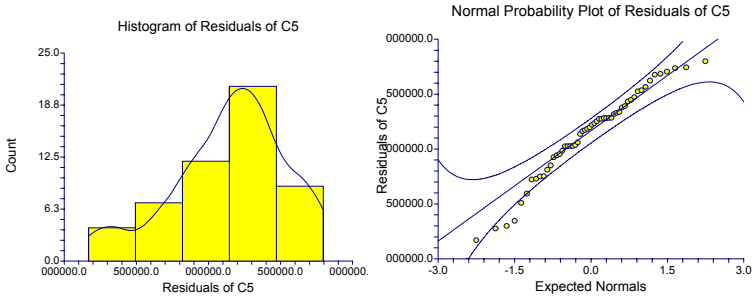
Dependent C5

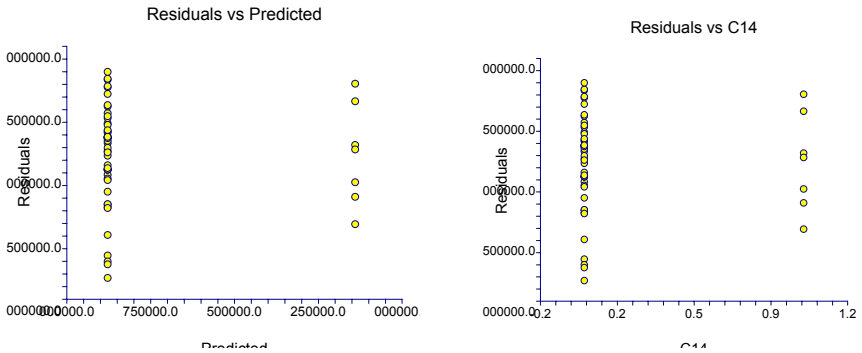
Multicollinearity Section

Independent Variable	Variance Inflation	R-Squared Vs Other X's	Tolerance	Diagonal of X'X Inverse
C14	1.000000	0.000000	1.000000	0.1641337

Eigenvalues of Centered Correlations

No.	Incremental Eigenvalue	Cumulative Percent	Condition Percent	Number
1	1.00000	100..00	100.00	1.00





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