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# Student Price Response: The Effect of Tuition Deregulation in Texas on Student Enrollment Trends in Texas Public Institutions of Higher Education

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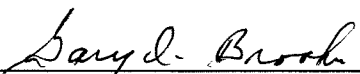
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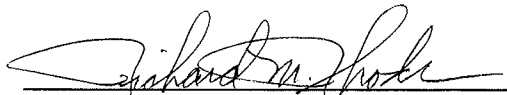
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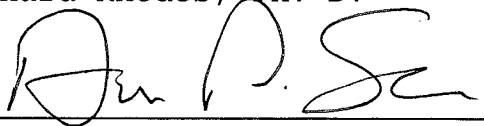
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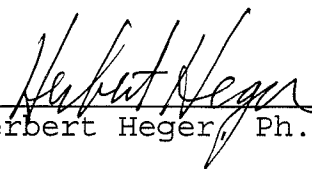
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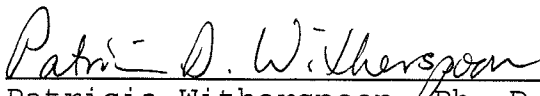
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IN TEXAS ON STUDENT ENROLLMENT TRENDS IN TEXAS  
PUBLIC INSTITUTIONS OF HIGHER EDUCATION

by

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DISSERTATION

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THE UNIVERSITY OF TEXAS AT EL PASO

ABSTRACT

STUDENT PRICE RESPONSE: THE EFFECT OF TUITION DEREGULATION  
IN TEXAS ON STUDENT ENROLLMENT TRENDS IN TEXAS  
PUBLIC INSTITUTIONS OF HIGHER EDUCATION

This study examined the relationship between cost of attendance price increases in Texas public higher education institutions and enrollment. This study compared enrollment trends prior to and post deregulation of tuition setting authority in the State. The study focused on first-time full-time state-wide enrollment of all students and Hispanic students, and also analyzed enrollment trends at institutions located along the U.S./Mexico border and non-border for the same grouping of students. Enrollment behavior was tested for statistical significance to cost of attendance for all aforementioned geographic areas and student groups. A simple linear regression of pre-deregulation was used to predict enrollment in the post-deregulation periods and actual enrollment was compared to predicted enrollment to determine what effect, if any, cost increases had on enrollment behavior.

The findings of this study revealed significant positive relationships between enrollment and cost of attendance for State-wide total enrollment and Hispanic enrollment. The findings also revealed a significant positive relationship

between non-border institution total and Hispanic enrollment and cost of attendance. No significant relationship was found between border total and Hispanic enrollment and cost of attendance. These findings were inconsistent with studies included in the lit review and the underlying demand theory that framed this study. The researcher has identified additional areas for research that may provide insight into these unexpected results.

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## Chapter 1

### Introduction

#### Background

As the American population and the underlying economy struggle to adjust to global competition, the need to pursue and complete post-secondary education has become more important than ever. This increased interest has made accessibility to higher education a continued topic of discussion in the mainstream as well as an area of research interest. The policy decisions related to accessibility affect not only individual prosperity, but the nation's economy and global competitiveness.

Sociologists have studied differences in access to higher education and documented differences by class, race, and gender (Davies and Guppy, 1997). Accessibility is affected by a variety of different factors including individual educational achievement, geographic location, and cost amongst others.

Over the past 10-15 years, the cost of attendance at universities across the United States has escalated at a pace that has surpassed historical trends (Kelley, 2005). This escalation in the cost of attendance at U. S. institutions of higher education has been fueled by public policy changes at the federal and state levels that have reduced government investment in higher education. Public policy has shifted to a position that increasingly views higher education as a personal benefit

rather than a public good (Kelley, 2005). This shift has led to changes in financial aid programs which coupled with declines in state subsidies has increased the proportion of the cost that students must bear for their education (Kelley, 2005).

Reduced federal and state appropriations to higher education, combined with inflationary pressures related to faculty salaries, technology, employee benefits etc., have forced institutions of higher education to increasingly rely on tuition and fees to make up the revenue shortfall (Kelley, 2005). The resultant tuition and fee escalation has increased concern about the impact of such increases on continued enrollment and participation in higher education. In 2003 the State of Texas joined the rest of the states in this national trend by adopting legislation that accelerated cost of attendance increases.

Historically, the State of Texas Legislature has taken a conservative approach to higher education funding by retaining legislative authority to set tuition for all public higher education institutions (Texas Education Code, Section 54). This legislative control exposed tuition decisions to the political ideologies of elected representatives and this centrally controlled authority resulted in a high degree of predictability and conservative growth in cost. The State allocated general revenue appropriations, based on formula allocations that

focused primarily on measures of instructional delivery as demonstrated by credit hour production [Texas Higher Education Coordinating Board (THECB, 2002)]. This model of state funding and price control generally results in State general revenue appropriations that heavily subsidized the cost of instruction and maintained low levels of direct costs to students by strictly regulating tuition rates (Johnstone, 2005).

In the fall of 2002, due to a general economic downturn in the State and the nation as a whole, the State of Texas announced that all agencies and institutions of higher education would be required to implement a retroactive 7% reduction in general revenue appropriations. In an effort to mitigate the effect on student success, higher education institutions were directed to focus on reducing administrative costs to minimize the effect on direct services. However, cost side solutions that are implemented in response to funding reductions are usually not sustainable and result in students receiving less services and less support as a result of a decline in resources (Johnstone, 2005). A decline in services is unavoidable in an industry where most operating costs are embedded in salaries and benefits. Some short term financial maneuvers can be implemented, such as deferring maintenance, but ultimately cost reductions must include reductions in staff and these will affect delivery of services either directly or indirectly. These

conditions led to an effort, spearheaded by the Chancellor of the University of Texas System, to deregulate tuition.

This effort resulted in the deregulation of legacy tuition pricing mechanisms that served to maintain low direct cost via significant State subsidies. The University of Texas System spearheaded this deregulation effort, as they believed that the regulated system understated the true value of education and contributed to a status quo where students progressed at their own pace [The University of Texas System (UT System), 2009]. The UT System advocated for a deregulated environment that would allow total flexibility to university governing boards to determine direct cost to students and the assessment mechanisms that would maximize resources and efficiency.

#### **Statement of the Problem**

The effect of tuition deregulation and tuition discounting policies on higher education participation trends has been studied extensively and the results are well documented. The relatively recent changes in the Texas statute, which delegates price setting authority to institution governing boards, present a unique opportunity for additional inquiry into this relationship. This opportunity is the ability to observe student enrollment behavior pre and post a significant change in cost of attendance management authority. This change in authority has

led to a time of significant cost increases, fueled by tuition deregulation, that have occurred in the State of Texas.

The significant Hispanic population size in Texas, and specifically its concentration in border regions, allows for inquiry into how student sensitivity to price affects this ethnic group's enrollment behavior. Studies conducted previously have lacked sufficient representation of this ethnic group to determine if a correlation existed and its strength. The insight that can be provided by this study is not only relevant to the State of Texas but may also be useful in informing national policy discussions as demographic shifts clearly indicate that Hispanics are the fastest growing minority group nationwide (Martinez, 2004).

Hispanic participation in higher education, in general, is significantly lower than that of their Asian, White, and African American peer groups (Martinez, 2004). This low participation rate is driven by a variety of factors, not the least of which is cost. The deregulation, of a historically state regulated cost of attendance in Texas, has led to significant increases in cost of attendance at all of the public higher education institutions in Texas. Institutions have continued to experience enrollment growth, in spite of these cost increases. Additional inquiry is needed to understand if this enrollment growth is real with respect to overall increases in the underlying

population and how this enrollment growth has affected Hispanic participation amongst Texas' diverse ethnic population.

### **Theoretical Framework**

Much of the student price response research is rooted in demand theory and this study was similarly framed. Demand theory is appropriately suited because it posits that demand for a specific good or service will decline as cost increases (Leslie & Brinkman, 1987). This study was focused on student enrollment as demand to determine the effect, if any, that increases in price had on this demand. Demand theory states that demand for goods and services will be inversely related to changes in price, *ceteris paribus*. This is to say that as price increases the related demand for the good or service will decrease. This is based on the laws of supply and demand where equilibrium market price and quantity of a commodity is at the intersection of consumer demand and producer supply. Prices will naturally move in an appropriate direction to approach equilibrium and therefore maximize price. This theory is based on two, non-mutually exclusive, approaches - one that views the underlying drivers of demand as an investment and the other as consumption (Campbell & Siegel, 1967).

Given that higher education continues to be viewed as a means for social and economic upward mobility, demand as investment seems the most appropriate (Jackson & Weathersby,



1975). Demand theory states that price is affected by not only demand but also supply. It is important to note that public higher education does not manage price through supply side controls and instead will tend to function in an environment of perfect elasticity (Shin & Milton, 2006). Perfect elasticity is a condition where supply will increase to satisfy any and all demand that may exist. Public higher education is publicly funded, by definition, and continues to receive rate subsidies that encourage this perfectly elastic environment. Since these rate subsidies are non-existent for private non-profit and for profit institutions of higher education, these were excluded in this study.

### **Purpose of the Study**

The purposes of this study were: (1) to determine the effect, if any, of tuition and fee increases on the participation of students in Texas public higher education; (2) to determine the effect, if any, of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education; and (3) to determine the effect, if any, of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the US/Mexico border.

## **Relevance of Study**

Heller (1997) summarized the conclusion of his review in one sentence: "As the price of college goes up, the probability of enrollment tends to go down" (Heller, 1997, p. 649). This general finding was expected for all populations under demand theory, however the variability of the strength of this inverse correlation between different students of different SES and race continues to need additional research. This research is complicated by the multiple known and un-known variables that impact demand and consumption. "Changes in tuition effects over time have been suggested in several studies (Heller, 1999: Hsing & Chang, 1996; Leslie & Brinkman, 1987). However, no follow up study of these factors (tuition, financial aid, and unemployment) has been published since Heller (1999) conducted a time-series analysis using 1970s through 1994 data" (Shin & Milton, 2006, 214). Most of the studies reviewed were either focused on northern states (California being the one major exception) or were based on data that were collected when the countries underlying demographics were vastly different from what they are today. Martinez (2004) has established that unless Hispanic participation in higher education is increased significantly as a percent of the underlying growth of the group, we will face a serious shortfall of degree completers to meet the employment sector demand that baby boomer retirements

will create. Participation in higher education continues to increase for all racial and ethnic groups in spite of the increases in cost. Part of this phenomenon is driven by the comodification of education and the reality that, now more than ever, higher education is the primary vehicle for migration across the socioeconomic strata.

Increasing Hispanic participation in higher education is not only critical to meeting this future demand for educated professionals, it is also critical to creating a generation of leaders who mirror the underlying national demographics. The State of Texas offers a unique opportunity to study the effects of tuition increases on the participation of this population. The UT System public universities located in counties that border with Mexico reported Hispanic undergraduate enrollments of between 45% and 89% of the total population for the Fall 2004 semester (UT System Accountability & Performance Report, 2005). Similar participation rates are expected for the non-UT System public State universities that will be included in this study. Additionally, the State's Hispanic population, as a percent of total population, is a leading indicator of the future demographic trends for the nation as a whole. This specific demographic mix, coupled with significant increases in higher education costs, provide a unique opportunity to study Hispanic student price response in a context that will make the findings

nationally relevant. This additional information is critical to informing state and national policy where higher education costs are concerned.

### **Significance of the Study**

The cost of higher education is affected by the same inflationary pressures that affect the economy as a whole. Higher education is a business model that relies heavily on personal professional expertise for the delivery of educational and support services. As such, it must offer competitive compensation to faculty and staff alike to ensure the continuity of these services. The competition for talented faculty and staff is fierce and continues to be ever more challenging in an increasingly global economy. Therefore, continued price increases are an inevitable fact of life for higher education as they are for any other sector of the economy. This being the case, the question of how high the cost of education can rise before affecting demand is extremely relevant in today's environment.

The American economy was transformed from agrarian to industrial (manufacturing) in the 1800s and changed again from industrial to service intensive in the 1900s. The most recent change has increased the importance of the global economy by facilitating the exchange of information, ideas and intellectual work products across countries, continents and time-zones. This

new global economy, now more than ever demands that our population be more highly educated than ever before. This increased demand for highly trained professionals, in all sectors, comes at a time when the vast majority of our trained workforce is preparing for retirement. In order to meet the impending demand for an educated workforce, the country's educational infrastructure must increase accessibility particularly for the fastest growing demographic sector that has historically been under-represented. If America is unsuccessful in increasing current enrollment rates, it will slip further behind countries such as Canada, Korea and Sweden among others that have posted dramatic gains in their rates of college-degree attainment (Ruppert, 2003).

Census data reinforces the continued value of a college education. As of 2005, "workers 18 and over with a bachelor's degree earn an average of \$51,206 a year while those with a high school diploma earn \$27,915" (U.S. Census Bureau, 2005). Furthermore, these earnings increased to an average of \$74,602 for those who had professional or advanced degrees (U.S. Census Bureau, 2005).

Demographic evidence is clear that the Hispanic population growth continues to outpace all other minority subgroups (U.S. Census Bureau, 2005). Hispanic participation in higher education, however, has not increased at the same rate of growth

as the underlying population growth in spite of the fact that they are enrolling at higher rates when compared to other groups (Martinez, 2004). "About 10% of all Latino high school graduates enrolled in some form of college compared to 7% of the total population of high school graduates. Only Asians are enrolling at a higher rate (Fry, 2002, 2). This higher rate of enrollment unfortunately is not all good news as approximately 40% of these Hispanic students attend two-year institutions and more than half of these students never complete a postsecondary degree (Fry, 2002). According to 2004 data reported by the U.S. Census Bureau, 28% of the population 25 years old or older had completed at least a bachelor's degree. Within this same age group Hispanics (12.1%) trailed Asians (49.4%), non-Hispanic whites (30.6%), and African-Americans (17.6%) in the completion of a bachelor's degree or higher (U.S. Census Bureau, 2005).

It is also important to note that approximately 48% of Hispanics earned less than \$20,000 per year in 2006 and that the median household income for a Hispanic was \$38,235 (Pew Hispanic Center, 2008). In terms of access, cost of attendance, therefore represents a significant challenge for Hispanics to overcome. In 2003, 80% of students with family incomes over \$78,800 enrolled in college immediately after high school compared to only 49% of high school graduates from families in the lowest 40% of family income (Baum and Payea, 2005). Increased tuition costs have

outpaced the underlying growth in family income with only the wealthiest families seeing their income keep pace with these increases (National Center for Public Policy and Higher Education, 2002). The cost of tuition, at public four-year institutions, represented 13% of total family income for the lowest-income families in 1980 (National Center for Public Policy and Higher Education, 2002). By 2002, these same families have seen this cost increase to represent 25% of their family income (National Center for Public Policy and Higher Education, 2002). As previously mentioned, these financial hurdles are especially significant for Hispanics whose median household income falls in the lowest-income category.

The country's need for highly educated professionals to support ongoing global competitiveness can only be maintained by increasing overall participation and success rates. Efforts to increase Hispanic participation and success are a critical element to an overarching success strategy given this group's current and predicted demographic trends. Failure to increase these rates will require changes in immigration policy to allow for the importation of this expertise from abroad avoiding a decline in the nation's global competitiveness.

Previous studies have generally found that demand for higher education is inversely related to increases in price. This study attempted to determine if this behavior persists in

today's environment. It looked at how Texas' student participation rates have been affected by changes in price. Additionally, it looked at Hispanic participation rates specifically in an effort to observe if this group's response to price changes is consistent with previous studies and Texas' general trend. American society and the world are continually changing and this study will seek to understand how student demand for higher education in response to price increases has changed.

### **Research Questions**

The following research questions provided the focus for this study:

- 1) What is the effect of tuition and fee increases on participation of students in Texas public higher education?
- 2) What is the effect of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education?
- 3) What is the effect of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the U.S./Mexico border?



## **Definition of Terms**

*Students.* This term is defined as first time, full time freshmen enrolled in the Fall term as defined by the institution.

*In-State Resident.* This term is defined as a student who meets the Texas residency requirements.

*Under-represented minority.* This term is defined as traditional college age Hispanic students who enrolled in Texas public higher education institutions.

*Participation.* This term is defined as initial enrollment.

*Public higher education.* This term is defined as public four year colleges and universities authorized and funded by the State of Texas.

*Texas Border Region.* This term is defined as counties located in the area defined as the border in the Bordering the Future study published in July 1988 by then State Comptroller John Sharp. This is defined as the "...Texas side of the region that snakes in a southeasterly line beginning at the New Mexico state line in Anthony and running through El Paso all the way to San Antonio along Interstate 10, then down Interstate 37 to the north side of Corpus Christi on the Texas Gulf" (Sharp, 1988, p. 6).

## **Delimitations**

This study was delimited to first-time, full-time students who enrolled in the fall semester during the academic years 1987 to 2007. Ideally, in-State resident students would be selected for this study because their enrollment decisions are more directly impacted by price increases than are the decisions of out-of-state students (Shin & Milton, 2006). However, enrollment data reported to IPEDS does not include in-State resident status. Approximately 90% of students who enroll in Texas public institutions of higher education qualify as in-State residents, therefore total enrollment will be used for this study. This is important to note as out-of-State and international students are subject to much higher tuition and fee costs than their in-State peers and their enrollment decisions are generally affected by factors other than cost. To determine the effect of tuition and fee increases on Hispanics, the study was delimited to State-wide enrollment patterns for this minority group. The Texas Border region will include The University of Texas at El Paso, Sul Ross State University, The University of Texas at San Antonio, The University of Texas Pan American (Edinberg), The University of Texas at Brownsville, Texas A & M Kingsville, Texas A & M Corpus Christi, and Texas A & M International (Laredo).

## **Limitations**

The only apparent limitation of this study is the accuracy of State enrollment data that is self reported by individual institutions to the Integrated Post Secondary Education Data System (IPEDS).

## **Summary**

Cost of attendance and therefore tuition pricing are important variables that affect individual participation, as demonstrated by initial enrollment, in institutions of higher education. The sensitivity of student enrollment and how it is affected by changes in price has been affirmed via research. However, many of these studies were completed over a decade ago and were based on extremely old datasets. As such, this relationship requires additional study to understand how recent acceleration in cost of attendance increases has affected participation. This additional work must also include studies that increase our understanding of the effect on participation of under-represented minorities, specifically Hispanics. This study will focus on Texas students and their participation in higher education pre and post State-wide changes in tuition policy.

## Chapter 2

### Review of the Literature

#### Introduction

Each year high school seniors all over the U.S. evaluate their post graduation options. Some have meticulously planned for their college experience since their freshman year, but many are just now realizing that they will need to make choices that will affect the rest of their lives. Some may choose to enter the workforce, join the military, or pursue a trade-based education program while others will begin to seriously consider their college and university options. Those students who engaged in early planning have in all probability been investigating the cost of education, engaging their parents to develop a financial plan, and have applied for need or merit-based financial aid and scholarship programs. Many are beginning to realize that the cost of attendance may exceed their family's ability to support their educational aspirations. While much progress has been made in mitigating the effect of traditional barriers that have limited access, the cost increases at private for profit, private non-profit and public colleges and universities is an area that merits additional study.

The demand for post-secondary education has increased in response to the changes in all sectors of the economy that require more education. Over the past 10-15 years, the cost of

attendance at universities across the United States has escalated at a pace that has surpassed historical trends (Kelley, 2005). This escalation in the cost of attendance at U. S. institutions of higher education has been fueled by public policy changes at the federal and state levels that have reduced government investment in higher education. Current public policy views higher education as a personal benefit rather than a public good, thus students should bear a higher proportion of the cost of their education (Kelley, 2005). The reduced federal and state appropriations to higher education, coupled with inflationary pressures related to faculty salaries, technology, employee benefits, etc., have forced institutions of higher education to increasingly rely on tuition and fees to make up the revenue shortfall (Kelley, 2005). The resultant tuition and fee escalation has now resulted in concern about the impact of such increases on continued enrollment and participation in higher education.

This study will focus on understanding the effect of cost of attendance increases (tuition and fees) on participation in Texas public higher education institutions. While the study will evaluate the overall impact on enrollment trends in Texas, the study will also include an analysis of the effect on students of different races/ethnicities and different sectors of the State (rural, urban, and border). It is important to establish the

relevance of this study within the current context of the rising cost of attendance and the need to look at the effect on populations by race/ethnicity. This chapter will first provide a historical and policy analysis of the economic and social changes that have led to cost increases in higher education and will provide specific arguments for the relevance of Hispanic population enrollment/participation behavior. Finally, a review of the relevant literature involving student demand studies will be provided to establish what is already known on this topic and to identify specific reasons for the relevance of this study.

### **History and Policy Analysis**

Public higher education has historically received a large portion of its revenue from federal and state governments (Hossler, Lund, Ramin, Westfall & Irish, 1997). Tax revenue shortfalls experienced by both the state and federal governments during the 1980s and again in early 2002 through 2005 resulted in a general decline in state support. The estimated federal share of higher education expenditures declined by 4% (from 18% to 14%), between 1980 and 1992 (Hossler, et al, 1997). "In FY 1989-90, state government appropriations, grants and contracts accounted for 41.7% of the current fund revenues for public colleges and universities. In contrast, federal government appropriations, grants and contracts accounted for only 10.3% while tuition and fees accounted for 15.5%" (Hossler, et al,

1997, p. 161). These trends continue and have increased the pressures on individual cost of attendance. A National Status Report on the Affordability of Higher Education (2002) published by the National Center for Public Policy and Higher Education (NCPPE) reported trends that support this assertion. The NCPPE report indicated that average cost of attendance at four year public colleges and universities represented 12% of income for lowest-income families (NCPPE, 2002). It also reported that the average cost of tuition and fees has increased to 25% of income for a similar comparison group in 2001 (NCPPE, 2002). During the period of 1992 to 2001, tuition at four year public colleges and universities rose faster than family income in most states (HCPPE, 2002). This increased in spite of increases to state appropriations that outpaced both inflation and enrollments (NCPPE, 2002). The cost of attendance escalation continues as demonstrated by unprecedented increases in Texas where a growth rate of 61.4% was experienced between 2002 and 2006 (Strayhorn, 2006). Cost of attendance, nationwide and in particular in Texas, in all likelihood is driven by continued and persistent reductions in State funding. This is demonstrated by a reduction of nearly 20%, in real dollars, that has occurred in Texas between 2002 and 2007 (Strayhorn, 2006).

This has resulted in troubled times for higher education that have been exacerbated by an increase in competing demands

for state funds, a decrease in federal financial aid, and struggling state economies (St. John, 1991). The overall decline in the general economic conditions across the nation has led to declines in disposable family income and increased demand for postsecondary education (Hossler, et al, 1997). The increase in demand coupled with an overall decrease in public revenue support, has resulted in a cost shift to students and their families. The decline in state and federal support has resulted in increases in tuition and fees that have grown at a faster rate than inflation (St. John, 1991).

The aforementioned changes in public funds support for higher education have resulted in an increased interest in the dialogue surrounding higher education funding. These discussions are underpinned by the following basic arguments. The first is that higher education is a basic right and should therefore be free (Barr, 2004). "The assertion is that access to higher education is a right, is a value judgment that commands widespread agreement. But it does not follow that higher education must be free. We all agree that food is a basic right, yet competitive supply at market prices is uncontentionous. The equity objective is not free higher education, but a system in which no bright person is denied a place because he or she comes from a disadvantaged background" (Barr, 2004, 266). The second is that it is immoral to charge for education (Barr,



2004). "It is immoral (in my view) if people with the aptitude and desire are denied access to higher education because they cannot afford it; it is also immoral if under-funded earlier education means that they never even aspire to university" (Barr, 2004, 266).

Philosophical differences raised by the preceding arguments give rise to policy arguments regarding higher education funding and access. One argument is for a high cost-high aid model for colleges and universities that suggests that the higher cost more accurately reflects the actual cost of attendance (Johnstone, 2005). This model allows for an equitable distribution of costs between students and the public based on ability to pay while students who are unable to pay the entire cost would receive financial aid to help defer these costs (Hossler, et al, 1997). Opponents of this model suggest that the free market is not the way to finance higher education.

This free market model assumes that people are well informed and ignores the socio-economic and social barriers that represent a significant challenge that individuals with limited cultural capital must overcome to access information and the extent to which people are well informed (Barr, 2004). This is to say that students from disadvantaged backgrounds may not even think of pursuing higher education because they are unaware that these financial assistance programs are available. Further,

even if they are aware, they and their parents may lack the resources (cultural/social capital) needed to navigate the complex systems/procedures that they must overcome to gain access to them. These opponents argue that the high cost would affect public perceptions of affordability that when coupled with a limited understanding of financial aid may negatively impact educational access (Hossler, et al, 1997).

Thus, the debate on higher education funding has become focused on a system or systems that serve equity and access through cost sharing. The term cost sharing assumes that the costs of fully funding higher education are shared, in varying percentages, by four parties: governments (state and federal), students, parents and philanthropists (Johnstone, 2005). The unavoidable issue thus becomes one of ensuring that the proportional distribution of the total cost amongst the four constituencies is appropriate. The focus of the current policy debate is to engage in an appropriate increase in cost sharing by students because they will ultimately derive a form of increased financial or personal success as a result of their educational attainment (Johnstone, 2005). This change requires a significant shift in how education is valued; it decreases its value as a public good and increases the private good value - which is more clearly aligned with a free market model. There is general agreement that a cost sharing increase to students is

appropriate, but disagreement on how ability to pay for this should be measured (Barr, 2004). Should the individual cost sharing measurement be constructed based on current income or future income (Barr, 2004)?

Policy models that focus on measuring an individual's current ability to pay lead to increased support for low socio-economic status families by providing financial resources that require little or no repayment (Barr, 2004). This is the current model used in providing access to low socio-economic status individuals in the United States. This model provides financial support to qualified low socio-economic status students to attend the institution of their choice (private or public). This support is provided to these low socio-economic status students even if the recipient ends up achieving a financially lucrative future (Barr, 2004). This fact, coupled with a general shift to a private benefit model, has led policy-makers to a change in policy direction that has resulted in a real dollar decline in the value of the maximum financial aid award (Pell Grant) and a decrease in funds allocated to these federal programs (Hossler, et al, 1997). This reflects a shift in responsibility for financing higher education from public funds to personal (private) funds which for many typically means increased borrowing. This change will tend to affect mid and low socio-economic status students as their families will lack

financial resources and must borrow in the hope that their education will result in an increase in future earnings that will have a positive impact on their ability to repay these loans. "It is estimated that students and their families now pay approximately 142% more when compared to their level of effort from 1980" (Hossler, et al, 1997, p. 162). Since policy direction is away from free aid to low socio-economic status students and the cost of tuition and fees is growing at a rate that both exceeds inflation and financial aid growth, students and their families are increasingly turning to student loans to finance their education costs (Hossler, et al, 1997).

### **Changes in Texas**

During this same time period, tuition charges at public universities have increased which has resulted in a troubled period for public higher education (St. John, 1991). "State legislatures across the country have been examining proposals that would abandon subsidized lower-cost public tuition model in favor of a high tuition-high financial aid model" (Hossler, et al, 1997, p. 162). These changes have also affected the State of Texas. "The level of institutional support of public institutions helps to determine the tuition paid by students; the higher the support provided by the state, the lower generally is the tuition paid by all students" (Heller, 1999, 65). Historically, the State of Texas Legislature has taken a

conservative approach to higher education funding by retaining the authority to set tuition for all public higher education institutions (Texas Education Code-Section 54 Tuition and Fees). Until September of 2003 the State maintained relatively low tuition rates at all public institutions by subsidizing the cost with direct appropriations (Texas Legislature - HB 3015, n.d.). The State allocated general revenue appropriations, based on formula allocations that focused primarily on measures of instruction delivery as demonstrated by credit hour production (THECB, 2002).

Texas allocates resources based primarily on two formulas, the instruction and operations formula which is used to allocate approximately 80% of all funds available and an infrastructure formula which is used to allocate the remaining 20%. The instruction and operations formula, as the name implies, provides funding to support the direct costs of instruction delivery and administration (Texas Legislature 80<sup>th</sup> Regular Session - House Bill 1, 2007). The funds allocated by this formula primarily support faculty salaries, academic and non-academic administrative salaries, library operations, student support services (i.e. admissions, financial aid, etc..) and general operating costs for these units. The infrastructure support formula provides funding for the indirect costs related to instruction and administration (Texas Legislature 80<sup>th</sup> Regular

Session - House Bill 1, 2007). These costs primarily revolve around facilities maintenance and operations which include custodial services, facilities and grounds maintenance, planning and construction, and utilities. The funding formulas are based on an all funds approach that includes general revenue, collected by the State, and statutory tuition, collected by each individual college/university (THECB, 2002). It is important to understand that colleges and universities in Texas collect both a statutory tuition, which is legislatively controlled, and a designated tuition. Designated tuition represents the deregulated portion of tuition that colleges and universities may establish at a rate "that the governing board considers necessary for the effective operation of the institution" (Texas Education Code, Sec. 54.0513 Designated Tuition).

The instruction and operations formula is based on semester credit hour production weighted by discipline, and (the lower of) student or course level. Discipline weighting factors are reviewed bi-annually by a formula study committee of the Texas Higher Education Coordinating Board (THECB, 2002). The formula study committee and the THECB conduct a cost study where they require all public institutions to submit institutional cost of instruction information by discipline. This cost study is reviewed by the committee and forms the basis for their recommendations, as they relate to the weighting factors, used

in the THECB formula recommendations to the State Legislature. The funding weights in Figure 1 were adopted by the Legislature for the 2008-2009 biennial appropriations period (80<sup>th</sup> Legislature - House Bill 1, 2007). Institutional semester credit hour production is adjusted by using the appropriate weighting factor to determine the total weighted semester credit hours.

| Discipline          | Lower Division | Upper Division | Masters | Doctoral | Special Professional |
|---------------------|----------------|----------------|---------|----------|----------------------|
| Liberal Arts        | 1.00           | 1.77           | 4.01    | 9.94     |                      |
| Science             | 1.67           | 2.93           | 7.29    | 20.05    |                      |
| Fine Arts           | 1.50           | 2.51           | 5.65    | 9.78     |                      |
| Teacher Ed          | 1.33           | 1.79           | 2.68    | 7.70     |                      |
| Agriculture         | 2.02           | 2.66           | 7.13    | 11.97    |                      |
| Engineering         | 2.46           | 3.51           | 7.39    | 17.05    |                      |
| Home Economics      | 1.17           | 1.83           | 3.21    | 7.10     |                      |
| Law                 |                |                |         |          | 3.55                 |
| Social Services     | 1.89           | 2.09           | 3.76    | 12.21    |                      |
| Library Services    | 1.14           | 1.21           | 3.03    | 7.68     |                      |
| Vocational Training | 1.90           | 2.37           |         |          |                      |
| Physical Training   | 1.29           | 1.49           |         |          |                      |
| Health Services     | 1.70           | 2.44           | 4.15    | 9.92     |                      |
| Pharmacy            | 1.76           | 3.85           | 14.90   | 25.27    | 5.13                 |
| Business Admin      | 1.18           | 1.68           | 3.70    | 19.08    |                      |
| Optometry           |                |                | 5.46    | 19.12    | 7.00                 |
| Teacher Ed Practice | 1.31           | 1.99           |         |          |                      |
| Technology          | 1.85           | 2.42           | 5.08    |          |                      |
| Nursing             | 2.73           | 3.24           | 5.36    | 11.79    |                      |
| Developmental Ed    | 1.00           |                |         |          |                      |
| Veterinary Medicine |                |                |         |          | 14.24                |

Figure 1. 2008 - 2009 Biennium - General Academics Instruction & Operation Formula Funding Matrix - Biennial rate per weighted semester credit hour (WSCH).

The State's Legislative Budget Board (LBB) collects statutory tuition revenue estimates from all of the public four year colleges and universities. These revised statutory tuition

revenue estimates are reviewed and certified by the LBB to ensure that appropriate and achievable enrollment growth factors have been included. These certified state-wide revenue amounts are then added to the base amount of general revenue that was allocated to this higher education formula in the previous biennium. This combined total represents all funds that are available for appropriation via the instruction and operations formula for the biennial period under consideration. This all funds total is divided by the State-wide total weighted semester credit hours for all public four year colleges and universities to determine the funding factor ( $F_s$ ) per weighted semester credit hour that will be used in the instruction and operations formula. House Bill 1, the 2008-2009 General Appropriations Act, calculated this amount of funding at \$59.02 per weighted semester credit hour (80<sup>th</sup> Legislature - House Bill 1, 2007). Individual institutional appropriations are therefore allocated by a formula that includes the following factors: semester credit hour (SCH), appropriate weighting factor as determined by funding matrix (W), all funds funding factor as determined by LBB ( $F_s$ ). The funding formula is expressed as  $\sum = (SCH * W * F_s)_1 + (SCH * W * F_s)_2 + \dots + (SCH * W * F_s)_x$ .

The infrastructure support formula allocates funding to support ongoing operation and maintenance costs associated with the university's physical plant and related utilities (80<sup>th</sup>



Legislature - House Bill 1, 2007). Allocations are based on predicted square feet for universities' education and general activities as produced by the THECB Space Projection Model. The THECB Space Projection Model predicts the space needs of an institution in five categories: teaching, library, research, and office and space support (THECB, 2002). The estimates for each of these categories are driven by student level, faculty and staff full time equivalents, and research expenditures. This formula functions similarly to the instruction and operations formula in that it allocates all funds available based on a single factor - in this case predicted square feet. This is achieved by estimating all funds available in this formula category and dividing it by the State-wide total predicted square feet. House Bill 1, the 2008-2009 General Appropriations Act, calculated this amount of funding at \$6.19 per predicted square foot (80<sup>th</sup> Legislature - House Bill 1, 2007). Individual institutional appropriations are therefore allocated by a formula that includes the following factors: predicted square feet (SqFt) and all funds funding factor as determined by LBB ( $F_s$ ). The funding formula is expressed as  $\text{Total SqFt} * F_s$ .

Prior to passage of HB 3015 in 2003, the State Legislature regulated cost of attendance by imposing statutory limitations (caps) on specific fees that an institution could assess, including designated tuition which prior to deregulation was not

allowed to exceed the rate authorized for statutory tuition. The Legislature manipulated funds availability by increasing the amount of general revenue allocated to the formula, increasing statutory tuition or increased both simultaneously. Conservative increases in statutory tuition translated into significant additional State-wide revenues that, when coupled with additional general revenue maintained high levels of State subsidies.

Formula funding models, such as the one described above for Texas, results in general revenue appropriations that subsidize the cost of instruction and maintain low levels of direct cost to students by strictly regulating tuition rates (Johnstone, 2005). In the Fall of 2002, due to a general economic downturn in the State and the nation as a whole, the State announced that all State agencies (higher education included) would be required to implement a retroactive 7% reduction in general revenue appropriations. This reduction in general revenue support was to be focused on administrative costs to minimize the effect on direct services. Universities were required to maintain instructional capacity by reducing administrative operating costs. However, cost side solutions that are implemented in response to funding reductions are usually not sustainable and result in the student receiving less services/support as a result of a decline in resources (Johnstone, 2005). These

conditions led to an effort, spearheaded by the Chancellor of the University of Texas System, to deregulate tuition.

The University of Texas System argued that the historical State model used to set tuition in Texas did not provide sufficient pricing options for the array of services offered. Further, the model did not allow or provide for the use of consumer incentives, for students, to make efficient use of their time as well as personal and state resources. The State model mandated the same basic rate, in the form of statutory tuition and strict limits on other fees, across all state institutions of higher education. This State model did not differentiate between institutional tiers based on Carnegie classifications, market demand (regional vs. national), between types of programs offered, or the national prominence of these programs (UT System - Tuition Home Page, 2008). Therefore, the cost of tuition and fees was basically the same at the flagship universities (UT Austin/Texas A & M), large/mid size (UT El Paso/UT San Antonio) and small regional institutions (UT Permian Basin/UT Tyler) [UT System - Tuition Home Page, 2008]. While the total cost of attendance which includes housing, transportation and other costs varied by geographic area the basic underlying cost of tuition did not vary.

In its tuition home page, Sustaining Excellence and Opportunity, the UT System further argued that in times of

economic difficulty, the challenge is to maximize the use of existing assets and resources. Deregulation and tuition flexibility would permit not only maintenance of existing levels of service, but would increase institutional agility to anticipate and meet state-wide educational and economic development needs (UT System - Tuition Home Page, 2008). The UT System asserted that the historical model limited enrollment management activities which could be more effective and efficient if exposed to the market forces of supply and demand. A deregulated model provided the tools universities needed to achieve strategic goals, such as improve graduation rates by providing pricing models that encouraged higher course loads (UT System - Tuition Home Page, 2008). Decreasing time-to-degree would save students money by minimizing their exposure to tuition inflation/escalation, allow them to earn higher salaries by entering the workforce more quickly and earn more over their lifetime (UT System - Tuition Home Page, 2008). This would also increase the productivity of State resources by allowing a greater number of students to advance their higher education studies within the same physical resources (i.e. buildings). These additional resources would come directly from the consumer of the product or services rather than via a state subsidy and the increased market competition would therefore result in the improvement of academic programs (UT System - Tuition Home Page,

2008). The limited resources argument was of special significance at institutions where demand outstripped supply, such as UT Austin and Texas A & M, but was far more difficult to validate across the rest of the State's universities. It was uncertain what effect increasing cost of attendance, at institutions that have the physical capacity to accommodate additional enrollment, would have on enrollment and how large an impact it would have on enrollment. This is because most public institutions in Texas, as in other states, either have existing capacity or will expand to accommodate all students who demonstrate a desire to enroll (Heller, 1999).

State and higher education leaders felt that this pricing flexibility would resolve the funding crisis without a broad-based tax increase by converting higher education access into a commodity that is subject to market factors (Johnstone, 2005). Consumers would evaluate their specific needs/wants and determine what product was appropriate for them. Tuition flexibility would increase student access by providing additional resources to a financially strapped industry, increase student success by encouraging shorter graduation times, and increase institutional excellence as universities reacted to increased consumer demands for higher quality (UT System - Tuition Home Page, 2008). The effort of the University of Texas System, with the support of Texas A & M, the University

of Houston and Texas Tech Systems resulted in the deregulation of tuition pricing mechanisms that served to maintain a low direct cost as approved by the 78<sup>th</sup> Regular Session of the Texas Legislature in House Bill (HB) 3105 (Texas Legislature, 78<sup>th</sup> Regular Session, House Bill 3015).

It was widely understood by the university systems and the State Legislature that this change was needed to allow universities a mechanism to recover some of the revenues lost via the appropriation reductions. The University of Texas System officials spearheaded this deregulation effort, because they believed that the regulated system understated the "real value" of education and contributed to a status quo where students progressed at their own pace (UT System - Tuition Home Page, 2008). The UT System advocated for a deregulated environment that would allow total flexibility to university governing boards to determine direct cost to students and the assessment mechanisms that would maximize resources and efficiency.

It is important to understand that in spite of significant increases in the cost of tuition and fees, public higher education in Texas continues to represent a high educational value when compared to the total cost of attendance for similar peer institutions outside of Texas (UT System - Tuition Home Page, 2008). Enrollment across all Texas public higher education institutions continues to grow and this growth is

often pointed to as an indicator that cost increases have not affected access (THECB, 2002). The State's institutions located along the US-Mexico border generally serve a student population that is disproportionately Hispanic and they present a unique opportunity to develop an understanding for how increases in cost and tuition discounting tools/models impact their higher education access, participation and success.

As a direct result of tuition deregulation, cost of attendance at Texas public four year colleges and universities has increased at an unprecedented 61.4% between 2002 and 2006 (Strayhorn,2006). This increase in price has exceeded the rate of growth in higher education cost inflation and the average growth in tuition and fees at public universities nationally (Hamilton, 2008). The State has decreased funding for public four year colleges and universities, in real dollars, by 19.92% from fiscal year 2002 to 2007 (Strayhorn, 2006). It is clear that institutions of higher education have had little or no option regarding increases in cost of attendance. As the State continues to reduce the public subsidies that institutions rely on for operations, they must increase costs directly to consumer students in an effort to support cost escalations driven by continued enrollment growth and inflation. Texas' state-wide average cost of attendance has risen so rapidly that it now exceeds the national average cost of attendance at public four

year colleges and universities in the most populous and regional states (Hamilton, 2008). It is interesting to note that enrollment growth has continued at an average rate of 2% per year between 2001 and 2006 (THECB - Higher Education Data, n.d.). Decreased cost to the State coupled with continued strength in demand, as demonstrated by enrollment, may encourage the Legislature to continue increasing direct consumer student cost of attendance.

### **Hispanic Participation**

According to Dr. Mario Martinez (2004), in his book *Postsecondary Participation and State Policy*, higher education's primary challenge is to meet future demand that will be driven by the retirement of baby boomers. This increased demand can only be met by increasing participation rates of the college age population. Hispanics are a significant portion of this growing segment and they tend to participate at lower rates than Whites and Blacks in postsecondary education. "Though Latinos may soon become America's largest minority group - thirty six (36) to thirty eight (38) million- in 1996 they earned only 4% of the college degrees awarded" (Keller, 2001, p. 226). An increase in Hispanic participation is urgent because Mexican-American women have the highest birth rate of any ethnic group, according to the National Center for Health Statistics report. (Keller, 2001) Critics urge colleges to become more aggressive in recruiting



immigrant youths and to provide the means necessary to ensure their success so that the future leadership of the United States will be more representative of its underlying ethnic population distribution (Keller, 2001). This will be difficult to achieve with Mexican-American students because they have an extremely high, high school non-completion rate (approximately 50%) (Keller, 2001).

State and federal support for higher education, both direct appropriations and federal financial aid programs, are under attack during a time when participation rates for college age students must increase if we are to meet the employment need that will be created by the predicted retirement of baby-boomers. The effect of these tuition deregulation and tuition discounting policies on Hispanic education participation trends is largely unknown and is critical to informing national policy as demographic shifts clearly indicate that Hispanics are the fastest growing minority group nationwide. Hispanic participation in higher education, in general, is significantly lower than that of their Asian, White, and African American peer groups (Martinez, 2004). This low participation rate is driven by a variety of factors, not the least of which is cost. Deregulation, of a historically State regulated cost of attendance, has led to significant increases in cost of attendance at all of the public higher education institutions in

Texas. State and institutional policy makers must gain a greater understanding of the effect, if any, cost increases supported by cost sharing philosophies have on the participation of all students. Given the changing demographics of the State and the nation, understanding the effect these cost increases have on Hispanic participation is particularly urgent.

### **Student Demand for Higher Education Studies**

Researchers have investigated, under a wide variety of theories and models, the factors that affect the postsecondary education decision making process. In the literature, these studies are generally known or referred to as studies of the student demand for higher education (Toutkoushian, 1999). These studies have focused on investigating the correlation between postsecondary enrollment and the factors that influenced the decision to attend a specific institution or a type of institution (public or private). American families have come to believe that some level of formal education, beyond high school is important from both a social and economic perspective. Post secondary participation, immediately after high school, continues to be low in spite of this wide held belief. Post secondary enrollment decisions are influenced by a variety of different factors that fall into either individual, institutional, or economic characteristics (Toutkoushian, 1999). While demonstrated academic ability, performance on the ACT or

SAT, is certainly an indicator of acceptance and eventual success it does not measure predisposition to participate. Researchers have found that an individual's family tends to have a significant effect on students and their plans to attend college (Stage & Hossler, 1989).

Prospective student's predisposition to pursue post-secondary education is influenced by a variety of individual characteristics. Student demonstrated academic achievement/ability and family income were found to be positively associated with intent to pursue post secondary education (Manski & Wise, 1983). Parental education attainment levels as well as parental encouragement have also been determined to be positively associated with student participation (Carpenter & Fleischman, 1987; Conklin & Dailey, 1981). Stage and Hossler (1989) conducted a study to examine the effects of family characteristics on post secondary education plans. In this study 3,834 students, and their families, were selected from 21 high schools within the state of Indiana. A cluster design was used to ensure that the sample selected contained adequate minority representation, an adequate distribution by socioeconomic status and included both rural and urban high schools. The researcher's results revealed interactions between parental education attainment and parental discussion that was more complex than that found in previous

studies (Stage & Hossler, 1989). While previous studies found that the mother's educational attainment was most influential, the researchers found that the father's educational attainment had the strongest influence on student postsecondary plans and also had a greater effect on the frequency of conversations with males (Stage & Hossler, 1989). The researchers also found that families with multiple siblings enrolled in college appeared less committed to supporting the postsecondary aspirations of their daughters than their sons (Stage & Hossler, 1989). Finally, the researchers determined that there was no relationship between the postsecondary plans for males and increased parental conversations or parental savings for college (Stage & Hossler, 1989). The study's results cannot be generalized due to its limited scope (State of Indiana high schools) and sampling strategies (not a random sample from the entire State or U.S.). Nonetheless, the study identified a potential difference in the influence of family characteristics influence between genders that should be looked at more closely.

In their book, *Going to College*, Hossler, Schmit and Vesper (1999) took an ethnographic approach to the issue of family characteristics and their influence on postsecondary plans. Their book was based on a longitudinal study conducted in the state of Indiana between 1986 and 1994. The study included survey responses from a cluster sample of 4,923 students as well

as interviews with 56 pre-freshman students who were interviewed at different points during high school and beyond. While their study looked at factors other than parental influence, the researchers found that parental expectations and encouragement had the most significant effect on student postsecondary aspirations followed by student achievement and parental educational attainment levels (Hossler, Schmit & Vesper, 1999). For many students, parental encouragement and support was the most significant factor in their consideration of pursuing a postsecondary education. The researchers reported that by the time they got to high school students spent a lot of time thinking about their future, but that female students thought more about their plans and talked more to their parents and others regarding their plans (Hossler, et. al., 1999). Since most families have already developed some thoughts about postsecondary education by the time their children are in the eighth grade, the researchers recommend that parental intervention techniques be implemented as early as possible to increase their probability of success (Hossler, et al., 1999). The researchers go on to recommend that these interventions focus on providing information to parents that will prompt conversations with their children about college. At this early stage the information should be general, simple and include all aspects of postsecondary issues including cost, financial aid,

career opportunities, areas of demand, etc. Once students have made the initial commitment, at least emotionally, to pursue a postsecondary education they focus on formulating specific decisions about which institution to attend.

Previous studies have lacked sufficient minority representation, specifically African Americans and Hispanics, to support inferences for parental support and student enrollment. A study of parental involvement as a form of social capital was conducted to specifically address this deficiency. The study was based on data from the second and third follow-ups to the National Educational Longitudinal Study (NELS - 1992 & 1994 follow-ups) and included 9,810 high school graduates from 1,006 high schools (Perna & Titus, 2005). The researchers generally found that parental involvement is positively related to enrollment for all students. The researchers also reported that African Americans were not as successful in converting parent-student discussions about education issues into enrollment but that parent initiated contact with the school, about academic issues, was more positively related to enrollment (Perna & Titus, 2005). The researchers also found that enrollment was positively related to the number of academically focused social networks available for parents and students at the school attended (Perna & Titus, 2005). Access to and availability of these types of academically focused social networks was lower at

high schools with high concentrations of African Americans and Hispanics (Perna & Titus, 2005). The researchers therefore concluded that while parental involvement was significant for all students, African Americans and Hispanics face greater challenges in converting their limited social capital into enrollment due to the lack of social networks at the high schools they attend (Perna & Titus, 2005).

The aforementioned studies and many others have focused on understanding the factors that influence the development of interest in postsecondary education and its conversion into application and finally enrollment. A separate focus of interest is the consideration of factors that affect an individual's decision to initially consider a particular institution. A study involving approximately 80% of New Hampshire's 1996 high school seniors (9,323 students) who had taken the Scholastic Aptitude Test (SAT) was conducted to determine the extent to which family income, first generation status, educational plans and academic achievement played a role in the selection of institutions where they sent their scores (Toutkoushian, 1999). New Hampshire SAT test takers were selected for this study because their characteristics were similar to national test takers in terms of academic achievement and parental educational attainment (Toutkoushian, 1999). Family characteristic influence on institution selection was limited to nine institutions that were

selected on the basis of their popularity with students in the study, size, scope, selectivity and cost (Toutkoushian, 1999).

The researchers wanted to understand what factors influence selection of institutions for consideration and if family income and parental education attainment affect this choice. The researchers found that students in the study considered similar institutions regardless of parental educational attainment (Toutkoushian, 1999). The researchers also found that the students considered similar institutions in spite of differences in family income and that students prefer institutions whose students display similar average ability as their own (Toutkoushian, 1999). The researchers observed that expressed interest in similar institutions should not be confused with actual increased access. These researchers noted that economically disadvantaged students face greater barriers to gaining admission to selective/expensive institutions and therefore may not apply or, if they do, successfully convert admission to enrollment (Toutkoushian, 1999). While New Hampshire students shared SAT characteristics with national test takers, the observations may not be applicable elsewhere given demographic differences between the State's population and the rest of the country (Toutkoushian, 1999). While this applicability limitation is significant related to postsecondary predisposition and conversion to enrollment, the observations



related to student interest in institutions with student profiles that mirror their individual preferences may not be similarly limited.

In addition to parental influence, additional factors affect the college selection and enrollment process that students and parents undertake. Leppel (1993) employed a gravity model to study factors that affected student enrollment in a private institution (Widener University). The study was based on financial aid applicant data provided by the university's Financial Aid Office (Leppel, 1993). This is a limitation of the study in spite of the fact that the data provided included all applicants, not just financial aid awardees. This study is based on a gravity model (modified for educational context) rooted in Newton's law of gravitation, "the magnitude of the gravitational force of attraction between two particles is directly proportional to the product of the masses and inversely proportional to the square of the distance between them" (Leppel, 1993, 388). The research performed a logit analysis to determine what factors influence a student's final enrollment decision (Leppel, 1993).

The researcher found that student's final enrollment decisions are positively influenced by academic achievement, which in this case was represented by SAT score, and negatively affected by increased physical distance from the student's home

(Leppel, 1993). The researchers speculated that distance is a factor due to relocation and travel costs as well as increased ongoing costs (telephone and transportation). Physical distance may also limit student access to promotional and informational materials as well as access to institutional recruiters (Leppel, 1993). While the results reported, regarding distance, in this study are specific to this private institution and similar institutions, they seem inconsistent with the large appeal and attraction of nationally and regionally competitive private and public institutions. This is especially true for highly competitive institutions that attract students both nationally and internationally and would seem to not be affected by distance in their appeal to prospective students.

A conditional logistic choice model analysis of data collected in The National Longitudinal Study of the Class of 1972, the High School and Beyond and the National Education Longitudinal Study 1988 was conducted to gain additional insight into the postsecondary decisions of high school graduates from 1972, 1982, and 1992 (Long, 2003). The researcher was interested in understanding how individuals make decisions about college and if the factors that influence this decision making process had changed over the 30 year period covered by his study. The researcher found that the effect of college cost on the enrollment decision had diminished over time and college cost

was a significant factor for 1972 high school graduates, however this effect diminished somewhat for 1982 high school graduates and it did not help explain enrollment decision differences for 1992 high school graduates (Long, 2003). The researcher asserted that this is evidence of the need for additional research on significant factors, other than cost, that affect enrollment such as family characteristics, high school preparation or academic ability (Long, 2003). This is not to say that cost of attendance affected all groups in the study similarly. The researcher also found that while the effect of cost decreased over the period studied for all students, the decrease was not as significant for students from low income families and that for this group cost continued to represent a significant obstacle to overcome (Long, 2003). The researcher also found that distance decreased in significance for all groups and that institutional attributes, which suggest a better match for the prospective student, increased in significance (Long, 2003).

Yet another study analyzed the correlation between multiple independent variables and three dependent variables to determine their effect on student participation in higher education and into field of study. This study looked at field of study, college selectivity, and a combined dummy variable with the most selective and most lucrative field of study while the independent variables were gender, number of siblings, family

structure, age, ethnicity, family cultural resources, socioeconomic status (SES), AFQT scores and high school curriculum track (Davies & Guppy, 1997). This study was based on data collected as part of The National Longitudinal Survey of Youth supplemented by institution selectivity scores from the Higher Education Research Institute. The researchers found that student enrollment in selective institutions and lucrative fields were positively related to high socioeconomic level, access to more cultural resources, and that males were more likely than females to enroll in these programs at selective institutions (Davies & Guppy, 1997). The researchers also found that academic ability and completion of rigorous high school programs were also positively related to entering lucrative fields at selective institutions (Davies & Guppy, 1997). The researchers also noted that academic ability alone was insufficient to overcome low SES status with respect to selective institutions and noted that this was probably due to the high cost of attendance associated with these institutions. This study reinforced gender, academic ability and socioeconomic status as strong determinants of participation in the most selective institutions and most lucrative fields.

The relationship between participation in higher education and cost of attendance has been studied in a variety of different approaches. There is some disagreement regarding the

issue of how to define and measure cost of attendance - should the variable be net or gross cost. Gross cost is defined as the advertised cost of attendance that any student is required to pay in order to attend a particular college or university. Net cost on the other hand is the cost of attendance net of any merit based competitive aid, need based financial aid, or other discount that a student may qualify for due to specific characteristics (i.e. dependent child of current employee). Proponents of the gross cost of attendance approach argue that this advertised cost is the most readily available factor, to parents and student, during their decision making process and therefore has a far more direct impact on their decision making processes. They further argue that minority and first generation students, and their parents, often lack the social capital needed to seek out, understand and effectively leverage the complex financial aid tools available to them. Net cost proponents have argued that all forms of financial aid are positively related to enrollment and some studies have determined that financial aid has a greater impact on the enrollment decision than do tuition charges (St. John, 1993). Public policy arguments in support of federal financial aid are based on the underlying assumption that it has a positive effect on enrollment in general and is particularly important in the

enrollment of less-affluent, typically under-represented minority students (McPherson & Schapiro, 1991).

The net cost of attendance approach has led to significant studies to examine the impact of financial aid offers on college enrollment decisions. Braunstein, McGrath and Pescatrice (1999) conducted a study to analyze the impact of financial aid on the enrollment decisions for first-time accepted applicants, an average of 2,300 students per year, to Iona College (Braunstein, McGrath & Pescatrice, 1999). The successful conversion of accepted applicants has increased in importance to college and university administrators and these researchers sought to understand how financial aid could be leveraged to increase the conversion rate. This was a three year study, including data for academic years 1991-92, 1993-94, and 1995-96, of enrollment trends at a medium-sized, private, liberal arts, suburban, commuter institution (Braunstein, et.al., 1999). The researchers stratified applicant data by family income and established a control group where family income was either not reported or greater than \$85,000, while the remaining applicants were stratified into groups where reported family income was between \$1-\$24,999, \$25,000 - \$49,999, and \$50,000-\$84,999 (Braunstein, et. al.,1999).

The researchers found that a positive relationship existed between financial aid awards and enrollment. "The receipt of

financial aid had a positive impact on the enrollment decision of accepted applicants. For every \$1,000 increase in the amount of aid offered, the probability of enrollment increased between 1.1% and 2.5%" (Braunstein, et. al., 1999, 252). The researchers determined that for this particular type of institution, increases in financial aid were significantly related to enrollment for lower income applicants. Students in the control group enrolled at lower rates, but the researchers did not believe that this was related to financial aid and that their application to the institution was as a fallback or safety institution (Braunstein, et. al., 1999). It is important to understand that the researcher's findings and recommendations are limited in applicability to similar types of institutions.

McPherson and Schapiro (1991) performed a time-series based disaggregated econometric analysis of higher education enrollment behavior from 1974-1984. The study looked at enrollment, tuition, and financial aid information for population subgroups. The enrollment data were collected from the Current Population Survey (CPS) while the tuition and financial aid data were collected from The American Freshman survey collected for the same periods (McPherson & Schapiro, 1991). Due to the disaggregation techniques and the small samples of Blacks and other races in the CPS, the results reported in this study were limited to Whites only. The

researchers found that increases in net cost had a negative and statistically significant effect on enrollment for White students from low income families regardless of the whether the institution was public or private (McPherson & Schapiro, 1991). Their study looked at the enrollment patterns of White students in both private and public institutions stratified into three income levels and gender. The researchers offer that their findings are significant in addressing longstanding issues regarding the effectiveness of financial aid programs. The researchers also reported that their observations, as they relate to low-income students, were not observed in previous studies due to aggregated income strategies that masked the effect.

The sensitivity of White and Black enrollment to changes in net cost at a large (21,000 students), urban, public university (Virginia Commonwealth University- VCU) was analyzed for a six year period (1988-1993) (Wetzel, O'Toole & Peterson, 1998). Wetzel, O'Toole and Peterson (1998) performed an estimation relationship between enrollment and net cost of attendance based on generalized least squares random effects and controls for a number of different variables. The researchers observed that enrollment yields for the six year period were relatively insensitive to changes in net cost for all students combined (Wetzel, et. al., 1998). The researchers further observed that



Blacks were two-thirds more sensitive to changes in net cost than are White students and that this increased sensitivity may be an indicator that VCU's financial aid programs were succeeding in increasing minority access (Wetzel, et. al., 1998). The researchers extended these findings to conclude that increases in financial aid that serve to decrease net cost will have a relatively large impact on the enrollment yields of minority students at similar institutions (Wetzel, et. al, 1998). The finding that reductions in net cost have little or no effect on heterogeneous populations is consistent with the findings in previous studies. Large effects on sub populations were present for low income White students in the 1991 McPherson & Shapiro study and for Black students in this study. These findings may indicate that the effect of net tuition on enrollment may be diluted in studies that rely on heterogeneous averages.

As discussed earlier, net cost is normally defined as the advertised cost of attendance less any merit based competitive aid, need based aid or discount that the student may be eligible due to individual characteristics. The Wetzel, et. al. (1998) study focused on the effect of financial aid on the enrollment of Blacks. The researchers felt the results were significant for institutions seeking to leverage financial aid to increase minority access. Financial aid programs have increased as

federal and state policy makers increasingly see them as tools to facilitate access for all groups. Federal need based programs such as PELL have failed to keep pace with increases in cost of attendance. States have turned to merit aid programs, as an alternative, to recruit, retain and reward academically successful students within their constituencies (Heller, 2006). A study of the Michigan State Scholarship program was conducted to determine the impact of this specific merit aid program and similar programs as they are growing in popularity (Heller & Rogers, 2006).

The bivariate analysis was based on student educational assessment test data collected on 2000, 2001 and 2002 graduation classes along with high school characteristics reported by the State department of education (Heller & Rogers, 2006). In order to qualify for the merit aid students were required to earn a 1 or 2 (four point scale) on all four parts of the State's educational assessment exam or earn these scores on two parts of the exam and score in the top quartile nationally on the SAT or ACT (Heller & Rogers, 2006). The researchers found that 90% of Whites, 80% of Hispanics, and 71% of African Americans took the exam and that although 54% qualified for the merit aid the distribution was not proportional (Heller & Rogers, 2006). Each year over 50% of Whites, less than 40% of Hispanics, and 20% of African Americans qualified (Heller & Rogers, 2006). The

researchers found large differences in the scholarship qualification rates by racial groups (Heller & Rogers, 2006). In short, the researchers found that increases in merit aid did not translate into an increase in the participation of underrepresented minority students.

In a report, prepared by Heller (2006) for the Symposium on the Consequences of Merit-Based Student Aid, the researcher found that merit aid was awarded more frequently to students from high income families. The researcher also reported that need based aid was awarded more frequently to low income students and found similar award patterns with respect to race (Heller, 2006). Stated simply, low income and minority students were less likely to receive merit based financial aid and more likely to receive need based aid. As policy makers shift their attention to increasing funding for merit based aid programs, the researcher speculates that this will likely have a negative effect on college access for low income and underrepresented minority students (Heller, 2006). Highly competitive institutions have developed egalitarian policies that award students, who can demonstrate family income below a specific threshold, institutional aid to pay for their tuition and fee costs. These need based programs are great, but will do little to increase access as these students are required to meet

admission criteria required of all students for entrance (Heller, 2006).

Student price responsiveness has long been an issue of concern and study within higher education. As national trends continue to display a clear inclination toward increasing costs in higher education, research into the effect of these increases on enrollment trends is needed.

Merit aid programs proclaim to increase access for all students but the researchers found that minority and low SES status students receive a disproportionately small share of merit aid. Merit aid rewards students based on personal academic achievement, a concept that appeals to those who believe that education in the U.S. should be a meritocracy. It sounds reasonable and many are willing to accept that this is appropriate ignoring that White and upper income students, who have the highest postsecondary participation rates, receive a larger share of these awards (Heller & Marin 2002). Merit aid systems will often invest scarce State and institutional resources in support of students who will pursue and complete their postsecondary studies with or without this support. These programs dilute the State's capacity to appropriate additional subsidies that will benefit all students and do nothing to increase participation by underrepresented minorities (Heller & Marin, 2002). Unfortunately these programs are easy to justify

because Americans are all about rewarding the winner and this increases their political popularity.

Given the level of public investment in financial aid programs, one may infer that cost is no longer an access barrier to higher education in the United States (Heller & Rogers, 2006). Upon closer inspection, it is clear that little or no advances have been made in closing the participation gap between the rich and the poor (Heller & Rogers, 2006). This is staggering given that underrepresented minorities, Hispanics among them, are heavily represented in the lowest 30% of the socioeconomic spectrum and are more likely to be impacted by both real and perceived increases in cost. As public institutions of higher education continue to face reduced state and federal support they are increasingly forced to rely on tuition as their primary source of revenue growth (Kelley, 2005). Research that is focused on the effect of cost on participation is all the more urgent as support for public policy to increase the private - student cost of this education, and thereby decrease the public cost, continues to gain strength. There are many reasons for the historical and ongoing focus on student demand studies, and these can generally be classified under two overarching concerns (Leslie & Brinkman, 1987). "First, expanding and equalizing student access long has been a major public policy goal, and manipulation of price has

been seen as the major policy instrument for achieving this goal" (Leslie & Brinkman, 1987, p. 182). Federal and state policy direction has intensified in this area by focusing attention on student choice, creating direct student subsidy programs, and by managing tuition policy. "Second, there is a very practical reason for the large number of student demand studies; such issues conform nicely with the applied research capabilities that have been developed in econometrics" (Leslie & Brinkman, 1987, p. 182).

Heller (1997) asserted that this continues to be a driving concern in higher education today as tuition prices at both public and private institutions continue to rise. Real tuition costs increased at a faster rate at private institutions during the 1980s, but tuition cost at public institutions outpaced private institutions in the 1990s as well as the rate of inflation (Heller, 1997). "This has occurred at a time when incomes in the country have stagnated and the income gap between rich and poor families has widened. The net result is that college is even less affordable today than it was ten or twenty years ago" (Heller, 1997, p. 625). This trend has persisted into the early 2000s as decreased tax collections, as a result of poor economic conditions, have forced states to decrease subsidies to public colleges and universities resulting in a

shift of this cost burden to students and their families (Johnstone, 2004).

Demand theory holds that the quantity of a particular good or service demanded is influenced by price, income level of the potential buyer, price level of comparable goods/services, and the buyers' tastes or preferences (Leslie & Brinkman, 1997). The theory, in higher education, has been used to establish a negative correlation between price increases and enrollment. The studies conducted by Leslie and Brinkman (1987) and Heller (1997) found this negative correlation present in their quantitative research. Although this is an area of increasing public policy interest, little recent research is available on the topic and is the primary reason that Jackson and Heller continue to be the primary voices in the conversations. The shift in public policy toward viewing higher education as a private good that has led to price increases that continue to outpace inflation and personal income, require additional research to ensure that access continues to be supported - particularly for under-represented minorities (NCPPE, 1998).

Jackson and Weathersby (1975) reviewed seven major empirical studies of student demand and compared their results. The seven major studies that were included in this review used a wide array of conceptual approaches, data, and statistical techniques (Jackson & Weathersby, 1975). Given the high

variation between these studies, the researchers developed a mathematical recalculation of the effects observed for a typical student's response to a \$100 change in cost. The researchers found that cost of attendance was a statistically significant variable in enrollment decisions (Jackson & Weathersby, 1975). Cost increases resulted in declining enrollments however price responsiveness was inversely related to family income (Jackson & Weathersby, 1975). This is to say that students of low socioeconomic families were more sensitive to increases in price and that this may be affected by the uncertainty of financial aid awards.

Further, the researchers also found that price decreases are effective at increasing enrollments, more so than increases in financial aid (Jackson & Weathersby, 1975). This highlights some of the controversy revolving around the cost variable in price sensitivity studies. The finding is particularly interesting given the high level of interest, on the part of public higher education institutions, to migrate to a high-cost/high financial aid model. Finally, the researchers found that increasing financial assistance does improve access and increase enrollments, but did not determine a point of intersection where this effect is eroded by increase in cost (Jackson & Weathersby, 1975). In summary, increases in cost are inversely related to enrollment, the question of which measure



of cost (net or gross) has a greater effect on enrollment remained unresolved.

"Student demand studies, investigations into the economic factors that affect student enrollment, are probably second in number among higher education finance research only to studies of the rate of return of education" (Leslie and Brinkman, 1987, 182). Leslie and Brinkman (1987) prepared a meta-analysis by reviewing twenty-five studies of the relationship between price and college enrollment that were published between 1967 and 1982, including both cross-sectional (five) and time-series (twenty) analyses. The primary challenge was to standardize the study results as these studies examined different types of institutions, public and private, two-year and four-year. The standardization process involved "(1) transforming results to a common measure of student response to price change, (2) correcting all values to reflect consistent price levels, and (3) converting data from various age-group populations to a common age base" (Leslie & Brinkman, 1987, p. 184). Their standardization model was based on the work by Jackson and Weathersby (1975) and an improvement to their common measure of student response to price that corrected all values for variations in price levels and also converted varied age populations to a common base (age range utilized is 18-24 years old and price level is \$100 price change) [Leslie and Brinkman,

1997]. "This resulted in the calculation of a student price response coefficient (SPRC) for each of the studies reviewed. The SPRC which is defined as the college participation rate of 18-24-year-olds for every \$100 increase in tuition prices (in 1982-1983 dollars)" [Heller, 1997, p. 626]. As previously stated, because demand theory indicates that as prices rise, college enrollment rates should fall, this study and studies since then have found that a negative correlation exists between price and enrollment as observed in the calculated SPRC's.

Leslie and Brinkman (1987) found that SPRC's calculated from the twenty-five studies ranged from -0.2 to -2.4. "The modal response was an SPRC of -0.6, which they adopted as their best estimate for public policy purposes" (Heller, 1997, p. 626). The calculated SPRC's presented a relatively low effect on student enrollment behavior and were contradicted by the overall enrollment growth trends observed during these same periods (Leslie & Brinkman, 1987). Leslie and Brinkman (1987) explained that enrollment increases, in the face of increasing college prices, may have been influenced by price increases that were slower in real terms than nominal terms. It should also be noted that the researchers found that in studies where variables other than cost were included, the sociological variables, such as parental influence and parental educational attainment, demonstrated a greater influence on enrollment than did cost.

The researchers also noted that price sensitivity studies were normally concerned with the impact on freshman enrollment. This is generally because once enrolled student persistence is impacted by a variety of factors and cost is usually not as important (Leslie & Brinkman, 1987).

Heller (1997) updated the Leslie and Brinkman (1987) meta-analysis by incorporating findings from several quantitative studies which were conducted between 1987 and 1997. These studies were based on later cohorts and incorporated additional variables such as socio-economic status (SES), financial aid and race. The studies added in this subsequent review also filled in methodological gaps left by earlier studies and used both cross-sectional and time-series methodologies (similar to the original studies) [Heller 1997]. The studies were based on data collected by the following longitudinal and static survey tools: National Longitudinal Survey of Youth (NLSY), National Longitudinal Survey of 1972 (NLS72), High School and Beyond (HSB), Current Population Surveys (CPS), Integrated Postsecondary Education Data System (IPED), and American Freshman Survey. Both the Heller and Leslie and Brinkman reviews are meta-analyses of the quantitative studies.

As mentioned before, Heller (1997) determined that researchers found a common inverse relationship between price and student enrollment in higher education. The researchers

also determined that increases in financial aid did not necessarily result in an expected positive correlation in student enrollment but that the effect varied depending on the type of aid awarded (Heller, 1997). In general, student enrollment was more sensitive to increases in grants than loans. This gives rise to important policy questions concerning the relative student sensitivity to tuition and the effect of direct student subsidies. These student subsidies, viewed as a reduction in net price, are the same as a tuition reduction, however student enrollment response to these price reductions did not display similar results for these similar conditions (Leslie & Brinkman, 1987). This unexpected behavior may be impacted more by a higher level of awareness of the gross cost of attendance than by the available subsidy programs. Further, many federal and state financial aid and/or student subsidy programs are awarded based on financial need (Leslie & Brinkman, 1987). This behavior may be a result of a lack of awareness of the financial aid programs or a lack of the cultural capital needed to navigate the maze of forms, rules and regulations that are associated with these programs. Additionally, while students and their parents may be aware of the more heavily publicized cost of attendance, their decision to apply may be negatively affected even if they are aware of the financial aid

availability because they do not know how much aid will be received as this varies considerably between institutions.

These researchers did however find that the correlation between cost, financial aid and enrollment had a stronger effect on low SES students. The researchers found a strong sensitivity to price and financial aid in Black students however the results for Hispanic students were more mixed (Heller, 1997). The researchers were unable to determine how much of this effect was directly attributable to race versus race functioning as a proxy for SES. "Analyzing the relationship between financial aid and enrollment in public higher education is a more complex undertaking than looking just at tuition" (Heller, 1997). This is primarily due to the fact that financial aid incorporates many different forms of assistance including grants, subsidized loans, unsubsidized loans, tuition remission, and work study wages (Heller, 1997, p. 631). Students react differently to the various forms of financial and tuition charges, even if the economic value of different combinations of awards is substantially similar (Heller, 1997).

As previously mentioned, Leslie and Brinkman's (1987) meta-analysis included twenty-five studies conducted between 1968 and 1982 and focused on data collected between 1958 and 1974 (Leslie & Brinkman, 1987). Heller's 1997 analysis focused on studies conducted subsequent to the 1987 Leslie and Brinkman meta-

analysis between 1975 and 1996, however these studies were based on data that was collected between 1970 and 1992 (Heller, 1997). Fourteen of the twenty-five studies included in Leslie and Brinkman's meta-analysis were focused on single state populations with a heavy concentration of northern states. The remaining eleven studies were based on data that were more representative of the entire U.S. population such as census surveys. The vast majority of the studies reviewed by Heller (1997) were based on national level data collection efforts. The results of studies based on national data surveys were found to be consistent with price response studies conducted on state level data as SPRC's between -0.5 and -1.0 were consistently found (Heller, 1997). However, it is clear that additional work is needed to update price response studies for the dramatic demographic changes and to reflect the college price escalations that have accelerated since 1997. It is clear that college costs are much higher, both in real and nominal dollars, today than they were even five years ago as college costs continue to grow at a rate that is greater than the rate of inflation. Students, of all races and SES backgrounds, may be more sensitive to tuition increases today especially in the state of Texas where public university tuition increases (8.1%) for 2006 are approximately 50% higher than national trends (6.3%) and is roughly double the rate of inflation (Tresaugue, 2006).

Leslie and Brinkman (1987) did not report any race specific price response correlations. They did, however, discuss studies that focused on low SES populations and their enrollment response to price increases at different type of institutions. Heller's (1997) review included many studies that examined differences in sensitivity to tuition and aid changes among racial groups. His review found strong evidence of an inverse relationship to increases in cost and decreases in financial aid for Black students but did not find similarly strong evidence of a correlation between the variables studied and Hispanic students in general (Heller, 1997). The researcher recommended that additional research is needed to inform the policy discussion as it relates to under-represented minority participation (Hispanics) in an environment of increasing prices.

Shin and Milton (2006) conducted the most recent research published on the relationship of tuition effects on enrollment. The Shin and Milton study focused on measuring the effect of tuition increases, at a national level, on enrollment from 1998 to 2002 for in-state entering freshmen. Their study included control variables for competitor's tuition, college wage premium, and financial aid. The researchers found that the relationship between price increases, which were fairly moderate during the period at 12.8%, and enrollment was not significant

(Shin & Milton, 2006). They theorize that the lack of a significant negative correlation, which has been found by previous researchers, may explain why enrollments continued to increase during this time in spite of price increases (Shin & Milton, 2006). Their study did not include a measure of enrollment increases as a percent of the underlying eligible population. The observed growth may have simply occurred due to a greater change in the underlying demographics. Further, the time period studied was fairly short, compared to other studies, and the increase in cost was relatively slow - factors that may have contributed to a different conclusion than previous studies.

As noted earlier, Leslie and Brinkman's (1987) meta-analysis included twenty-five studies of the relationship between price and college enrollment that were published between 1967 and 1982, including both cross-sectional (five) and time-series (twenty) analyses. Cross-sectional studies form a class of research methods that revolve around the observation of a subset of a population to allow for the comparison of groups, within this population, and their behavior with respect to independent variables. Cross-sectional studies are typically limited to observing behavior at a single point in time and therefore provide a snapshot of the frequency and characteristics of population behavior toward an independent



variable(s). These cross-sectional studies have included studies to examine how recent high school graduates behave in the face of various postsecondary options (Heller, 1999). Researchers have also used multivariate analysis on datasets such as the High School and Beyond Survey to measure the relationship between tuition, financial aid, and other factors on student enrollment decisions (Heller, 1999). These types of studies are usually conducted with large sample sizes and therefore provide stronger statistical correlations for the subsets of data (Heller, 1999). They are limited to measuring these relationships at a single point in time and offer little insight to long term behavior.

In addition to cross-sectional studies, time-series analysis is also widely used to research this area of interest. Time-series is a sequence of data points, measured at successive times, and spaced in uniform time intervals. These methods attempt to understand the behavior in such time-series, to understand where they come from, and if possible what generated them (Box & Jenkins, 1970). These methods are frequently used to develop predictive models, based on known past events, to predict future events. Therefore, time-series studies can be used to examine changes that occur in student enrollment behavior over a period of time. Researchers have used these methods to relate the changes in enrollment as a reaction to

changes in cost of attendance during a period of time. The time-series approach allows for the measurement of these relationships over multiple years but is unable to track behavior changes of specific groups or subgroups (Heller, 1999). The time-series predictive nature is such that its accuracy increases with the number of series included in the model. This can be difficult to implement due to a lack of data for specific series or definitional changes that may occur between series and result in an artificial change in one of the variables.

### **Chapter Summary**

Researchers who have studied student demand for higher education have looked at a variety of different factors that affect enrollment. The college enrollment decision making process is affected by individual, institutional, and economic characteristics (Toutkoushian, 1999). This study will focus on providing additional insight into how economic factors affect enrollment and will include specific observations of the effect on Hispanic enrollment. Cost of attendance information is one of the most readily available pieces of information that students and families are exposed to in this decision making process. In many cases this may be the primary concern for parents and students - will I be able to afford to go to this or any college? While it is true that many students will not pay the full advertised cost of attendance, their interest in any

particular institution and higher education in general is invariable impacted by the highly publicized increases in the cost of higher education. While different studies have looked at both gross and net cost in relation to enrollment, there is no compelling argument that favors the use of one over the other. Financial aid programs have increased in variety and complexity with the addition of Federal income tax credits, state based merit aid programs, state merit based loan forgiveness programs, etc. The proliferation of these financial assistance programs has greatly complicated efforts to measure their effectiveness in reducing overall cost and their affect on enrollment. Therefore this study will focus on the relationship between gross cost of tuition and fees and enrollment

Thomas Friedman (2005) declared that the "world is flat" and that the U.S. must increase its post-secondary education efforts, amongst other factors, if it is to remain competitive in the new global economy. U.S. Census demographic data and Mario Martinez's trend analysis both clearly indicate that much of these efforts will need to focus on educating the burgeoning Hispanic population. Due to the age of the datasets used in prior price-response studies the results for Hispanic populations were inconclusive and merit additional inquiry. Demand for higher education will continue to increase as will

the cost of attendance and it is important to increase the understanding of the relationship between these two factors.

## Chapter 3

### Methodology

#### Introduction

The college enrollment decision has become increasingly complex with the addition of a large variety of tuition assistance programs coupled with more access than ever to institutional information regarding the variations in price and quality. American education has grown from a collection of relatively small markets, that focus heavily on local constituencies, to an industry that must compete in markets that are regional, national, and in some cases international. These significant changes have resulted in an intensification of efforts, by higher education institutions, to differentiate themselves in an education market that has become increasingly competitive and difficult for consumers to navigate given the complex cost and tuition assistance programs. The significant changes in higher education variation in terms of cost, quality, and tuition assistance have occurred at a time when cost of attendance has more than doubled. In spite of these cost increases and increasingly complex environment, the demand for higher education will continue to increase and with expected demographic shifts in the population age structure, absolute enrollment will increase (Ruppert, 2003).

The United States was tied for 13<sup>th</sup> place in bachelor's degree oriented higher education participation and 7<sup>th</sup> place in non-baccalaureate program participation when compared to the participation rates of 32 industrialized nations (Ruppert, 2003). In a labor market that is increasingly internationally competitive, these participation rates do not bode well for the economic future of our population. Postsecondary education completion has become more important than ever in today's information based economy. Generally speaking, college education is associated with increased access to employment and higher lifetime earnings. Unemployment rates of individuals who only completed high school tend to be 50% higher than that of individuals with a bachelor's degree and these individuals tend to earn an average 40% more in their lifetimes (Ruppert, 2003). Demographic data trends indicate that the Hispanic population is the fastest growing segment and is expected to increase by nearly 50% by 2015 (Ruppert, 2003). Despite gains in postsecondary participation rates, differences persist by race, ethnicity and socioeconomic status (Ruppert, 2003). "On nearly every measure of education and economic attainment there are wide disparities between Hispanic and Black populations, on the one hand, and their White, non-Hispanic counterparts" (Ruppert, 2003, 3). Hispanics are less likely to complete high school, a factor that places this group at a distinct disadvantage as

their non-completion rate is approximately 48% compared to 20% for the general population and 15% for Whites (Ruppert, 2003).

### **Purpose of the Study**

While absolute enrollment growth is good, for the country as a whole, it is important to gain an increased understanding of how enrollment trends are affected by cost increases. The purposes of this study was: (1) to determine the effect, if any, of tuition and fee increases on the participation of college age students in Texas public higher education; (2) to determine the effect, if any, of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education; and (3) to determine the effect, if any, of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the US/Mexico border.

### **Context**

The State of Texas' recent deregulation of tuition setting authority coupled with reductions in real dollar subsidies to public institutions of higher education has created an environment of increasing prices. Public four year institutions have been left little recourse but to increase the direct student cost of attendance by an alarming 61%, since deregulation, in a subvention effort to mitigate the impact of a 20% real dollar reduction in State subsidies (Strayhorn, 2006).

This study will analyze enrollment trends at all Texas institutions of public higher education to determine what effect, if any, price increases have had on overall participation rates. Enrollment in State institutions of public higher education have continued to grow at a rate of approximately 2% in the period immediately after deregulation when prices have grown at a rate faster than general inflation and faster than the higher education price index (Hamilton, 2008). While the State continues to enjoy enrollment growth, this should not be interpreted as a sign that price increases have had no effect on enrollment. The question of effect on enrollment must be studied within the context of a multi-year regression analysis to allow for observation of changes in behavior over an extended period of time.

The U.S. Census Bureau (2000) reported that 35.7% of the population in Texas was of Hispanic or Latino origin. If this population increases by 50%, as predicted by Ruppert (2003), the State's Hispanic population will approach 50% of the total by 2015. The State reports that Hispanic participation has increased from 24.2% in 2000 to 28.7% in 2008 (THECB - Higher Education Data, n.d.). Texas' population continues to grow rapidly and the accompanying demographic changes will undoubtedly increase the stress on public higher education where approximately 90% of postsecondary seekers in Texas will enroll



(Hamilton, 2008). Increasing Hispanic participation in higher education is critically important to sustaining State-wide economic levels and achieving the State's higher education plan as articulated in Closing the Gaps by 2015. In today's demographic reality of Texas, it is clear that increasing higher education participation of Hispanics is a high priority. This study focuses on this demographic in an effort to increase the understanding of how Hispanic enrollment trends are affected by increases in cost.

The Texas Border Region was defined in the Bordering the Future study published in July 1988 by then State Comptroller John Sharp. This region was defined as the "...Texas side of the region that snakes in a southeasterly line beginning at the New Mexico state line in Anthony and running through El Paso all the way to San Antonio along Interstate 10, then down Interstate 37 to the north side of Corpus Christi on the Texas Gulf" (Sharp, 1988, p. 6). The border region faces significantly different challenges than the rest of the State. At the time the report was completed, per capita income in this region was less than half of the State average and required significant improvements in education attainment to ensure that this did not deteriorate as forecasts indicated (Sharp, 1988). This stark economic challenge was a direct result of a regional industry that was mainly focused on basic manufacturing and a lack of highly

skilled workers to support “higher skill jobs in health care, business services, and higher value-added manufacturing” (Sharp, 1988, 14). Border population growth rates outpaced the growth rates of the rest of the State in both natural increases, due to a relatively young population, and net migration when illegal immigration is included (Sharp, 1988). Given this information, it was clear then as it is now that enrollment growth at public universities located within the border region, as defined, was not only critically important to the region but to the State as a whole. Further, Hispanic populations in the border region are well above the 32% rate that is present in the State as a whole. It is clear that the border region presents both significant challenges and opportunities for the State. Therefore, this study will look at how enrollment trends in the border region have been impacted by increases in cost.

### **Participants**

This study focused on the relationship between enrollment and price increases at public four year higher education institutions in the State of Texas as defined within the Texas Education Code Title III Section 61.003. This includes Angelo state University, Lamar University, Midwestern State University, Prairie View A & M University, Sam Houston State University, Stephen F. Austin University, Sul Ross State University, Tarleton State University, Texas A & M University, Texas A & M

University at Galveston, Texas A & M University - Commerce, Texas A & M University - Kingsville, Texas Southern University, Texas State University - San Marcos, Texas Tech University, Texas Woman's University, The University of Texas at Arlington, The University of Texas at Austin, The University of Texas at El Paso, The University of Texas at San Antonio, The University of Texas - Pan American, University of Houston, University of Houston - Downtown, University of North Texas and West Texas A & M University. The current education code identifies additional state institutions that will not be included in the study because these were only authorized to enroll upper division students during a portion of the time period studied. The excluded institutions are Texas A & M International University, Texas A & M University - Corpus Christi, Texas A & M University Texarkana, The University of Texas at Brownsville, The University of Texas at Dallas, The University of Texas at Tyler, The University of Texas of the Permian Basin, University of Houston - Clear Lake, and University of Houston Victoria.

The study was delimited to these particularly defined institutions since tuition deregulation, allowed under HB 3015, was specifically targeted at delegating price setting responsibility to these institutions. Community colleges are authorized in Section 130.0011 as primary governments that serve their local tax district by providing vocational, technical and

associates degrees and have the authority to levy taxes to subsidize cost of attendance. These institutions were not included in the study because they have different missions, student profiles, and have remained a low cost option for post secondary studies. Private institutions were also excluded from this study because they were not affected by the tuition deregulation and student decisions are affected by factors other than cost of attendance. Private institutions of higher education have much higher costs of attendance and student enrollment decisions are more likely to be affected by institutional financial aid provided.

This study was delimited to first-time, full-time students who enrolled in the fall semester during the academic years 1990 to 2006. First time undergraduate applicant acceptance and enrollment data reported by the THECB for the last ten years indicates that approximately 90% of all accepted students are Texas residents (THECB - Higher Education Data, n.d.). In-State resident students were selected because their enrollment decisions are more directly impacted by price increases than are the decisions of out-of-state students (Shin & Milton, 2006). Out-of-State and international students are subject to much higher tuition and fee costs than their in-State peers and their enrollment decisions are generally affected by factors other than cost.

## **Collection of Data**

Both total and Hispanic first-time, full-time enrollment data were collected for each public higher education institution included in the study. Separate models were analyzed to determine the effect of tuition and fee increases on total enrollments, statewide Hispanic enrollments, and Hispanic enrollments in the border region. The Texas border region included enrollment trends and cost data for The University of Texas at El Paso, Sul Ross State University, The University of Texas at San Antonio, The University of Texas Pan American (Edinberg), and Texas A & M Kingsville.

Participant data for this study were collected from the Integrated Postsecondary Education Data System (IPEDS) as reported by individual institutions to the National Center for Education Statistics (NCES-IPEDS). "IPEDS is the core postsecondary education data collection program for NCES. Data are collected from all primary providers of postsecondary education in the country in areas including enrollments, program completions, graduation rates, faculty, staff, finances, institutional prices, and student financial aid" (NCES-IPEDS). These data are made available to the general public via multi functional data mining tools. The Higher Education Act of 1992 mandated reporting and participation in this annual survey by any institution that participates in federal student financial

aid programs authorized under Title IV of the Higher Education Act of 1965. While participation prior to 1993 was not mandatory, all of the institutions included in this study voluntarily reported enrollment and cost of attendance data for years included in the study prior to this mandate. IPEDS defines the enrollment data element as "attendance or performance in an instructional activity (course or program) that can be applied by a recipient toward the requirements for a degree, diploma, certificate, or other formal award" (NCES-IPEDS). This study was limited by the accuracy of State enrollment data and cost data that is self reported by individual institutions.

All participant data were collected using the guest level access to the Peer Analysis System (PAS) available on the IPEDS website. This system provides a variety of analytical features that allow analysis of reported values between peers. The system also includes the ability to create new calculated variables, to sort and rank schools based on the data items selected, and to view standard report templates. To use the PAS system a focus institution must be identified as the basis for the comparative reports to be generated. The researcher selected The University of Texas at El Paso as the focus institution. A comparison group can be selected by name, variable or the IPEDS will auto generate a comparison group. The researcher created a comparison group using the Comparison Group Variable Selection table.

Membership to the comparison group was limited by Institutional characteristic values of TX within the state abbreviation associated with the institution and institutions identified as public 4 year or higher within the IPEDS' directory information. This process generated an initial list of 45 institutions that allowed for manual selection of the 25 institutions included in the study.

Once the comparison has been established, the PAS will require a selection of variables, from the master variables list, to be retrieved for the focus and comparison institutions. The PAS facilitates creation of the research variables list via a master list, a list that includes all elements reported on their survey that allows the researcher to add variables by simply choosing these from the surveys listed. The variables are presented in general categories that can be expanded for lower detail levels. Specific qualifying variables must then be tagged and an additional menu will ask the user to select the years of interest from a list of report years available for that variable. This process is repeated for each variable of interest.

Changes to the IPEDS survey were implemented between 1999 and 2000 to require additional detail reporting within existing definitions. Tuition and fee cost data were stored in different variables for the report years 1990 to 1999 versus 2000 to 2006.

The survey definition for tuition and required fees is the amount of money charged for undergraduate full time enrollment for instructional services. The survey further defined an in-district student as any enrolled student who is a legal resident of the locality in which he/she attends school and thus is entitled to reduced tuition and fee charges offered by the institution. Both of these definitions remained constant over the aforementioned time period, however in report years 1990 to 1999 costs were reported as a combined total for undergraduate tuition and fees and reported as separate elements in report years 2000 to 2006. The researcher selected the tuition and fees, full-time undergraduate, in-district variable for report years 1990 to 1999. For report years 2000 to 2006, two separate variables were selected, in-district average tuition for full-time undergraduates and in-district required fees for full-time undergraduates, and was combined for comparison to prior years.

Enrollment data collected for this study was the full-time enrollment for first-time students (total enrollment and Hispanic enrollment) reported into IPEDS as of the institutions official fall reporting date or October 15<sup>th</sup>. Institutions report enrollment data for all students by ethnicity, gender, enrollment status (full-time part-time), level of student (undergraduate, graduate, first-time, other degree seeking) along with a variety of other criteria. Again, as with tuition



and fee cost data, enrollment data were stored in two separate variables due to the reporting changes that were implemented in 2000. The researcher selected grand total enrollment and Hispanic total enrollment for first-time, undergraduate students. The PAS stores these data in two separate areas for report years 1994 to 2006 and report years 1990 to 1998, but the variable definition and selection was similar for all years. This was further tested by comparing enrollment data for the overlapping report years of 1994 to 1998 and the data returned by these variables was identical for all institutions and years.

Once the comparison groups and variables were defined within the PAS, the researcher executed an institutional data request within the Report & Stats menu. A user may request a single data query for the focus group and comparison group to include all variables and all years or process multiple requests for any combination of variables and years. The researcher requested separate reports and downloaded the data into an Excel spreadsheet for each variable selected with all years combined. Separate files were requested as follows: 1) separate file for all years was generated for the grand total enrollment of first-time, full-time, undergraduate students; 2) a separate file was generated for Hispanic total enrollment of first-time, full-time, undergraduate students; 3) a separate file was generated for report years 1990 to 1999 for tuition and fees, full-time,

undergraduate, in-district; 4) two separate files were generated for report years 2000 to 2006 for average tuition, full-time, undergraduate, in-district and required fees, full-time, undergraduate, in-district. These last two files were combined to calculate a comparable cost of tuition and fees for full-time undergraduate students. The researcher did not find any missing enrollment data for any institution or year. However, Sul Ross State University had missing tuition and fee data for 1990, as did Texas Woman's University for 1998, Texas A & M at Galveston for 2000 and Lamar University for 2005. The researcher corrected for the missing data by calculating the mid-point value between the previous and future year costs. Where no change was observed the amounts were corrected to reflect the previous year amount.

### **Research Design**

Economic models offer powerful theories and tools that support policy analysis generally and educational policy specifically. Policies are generally defined as "a program of actions adopted by a person, group, or government, or the set of principles on which they are based" (Policy, MSN Encarta, n.d.). Therefore, for purposes of this study education policies are defined as a set of rules, usually formally adopted by a government/institution, that are designed to achieve a specific goal (Paulsen & Toutkoushian, 2008). Educational policy analysis focuses on evaluating the effectiveness of one policy versus

another to determine which is more effective and informs the decision of choosing one over another. Economic theories are often assumed to be strictly concerned with financial and other business issues, however its structure and methodology are heavily rooted in a social and behavioral science (Paulsen & Toutkoushian, 2008).

The two most common economic theories used in the study of higher education are the human capital theory and the market model of demand and supply (Paulsen & Toutkoushian, 2008). The human capital theory is based on a variety of assumptions that can be summarized as follows - a rational consumer will choose to invest his/her finite resources in education versus other goods/services as long as the future benefits exceed the expected cost of education (Paulsen & Toutkoushian, 2008). Future benefits are assumed to be the increased wages that the individual student will earn in excess of peer students who do not earn a college degree. The cost of education in this comparison is assumed to include direct costs such as tuition and books, and indirect costs due to unrealized earnings during the time the student is enrolled in college and the decision to purchase education services versus other commodities or services. In sum human capital theory views the cost of education, both direct and indirect, as an investment that must

generate a rate of return that exceeds the rate of return in alternative investments, including consumption.

The Market model of supply and demand theory states that demand for goods and services will be inversely related to changes in price, *ceteris paribus*. This is based on the assumption that increased demand leads to a scarcity of the good or service and that this scarcity will lead to increased competition for this commodity and result in an increase in price. This is based on the laws of supply and demand where equilibrium market price and quantity of a commodity is at the intersection of consumer demand and producer supply. Prices will naturally move in an appropriate direction to approach equilibrium and therefore maximize price. This theory is based on two, non-mutually exclusive, approaches - one that views the underlying drivers of demand as an investment and the other as consumption (Campbell & Siegel, 1967).

Given that higher education continues to be viewed as a means for social and economic upward mobility, demand as investment seems to be the most appropriate (Jackson & Weathersby, 1975). This means that demand in higher education is influenced by a variety of factors to include cost, student academic ability, family background and school quality (Paulsen & Toutkoushian, 2008). Demand theory states that price is affected by not only demand but also supply. This generally

would mean that as more students seek to pursue higher education opportunities, the cost will naturally increase unless the number of opportunities (supply) is increased. This is an ongoing issue for highly competitive institutions whose applicant pools far exceed the institution's physical capacity to accommodate all qualified candidates who express an interest in attending. In a market driven system these institutions would theoretically increase cost until demand was equal to supply. However, it is important to note that public higher education does not manage price through supply side controls and instead will tend to function in an environment of perfect elasticity (Shin & Milton, 2006). Perfect elasticity is a condition where supply will increase to satisfy any and all demand that may exist. Public higher education is publicly funded by definition and continues to receive rate subsidies that encourage this perfectly elastic environment. This is not to say that public institutions cannot simultaneously be highly competitive institutions as these categories are not mutually exclusive. Within a state, the collective capacity of all public institutions would expand in a perfectly elastic manner to accommodate all demand with little or no effect on price. This can be achieved by leveraging underutilized or inefficient resources within the system to accommodate this incremental enrollment.

The research questions allowed the researcher to examine the relationship between cost and enrollment by testing the following hypotheses. Directional Hypothesis - tuition and fee increases will decrease participation in higher education for all students, Hispanics, and all students in Texas border region. Null Hypothesis - tuition and fee increases will increase higher education participation in higher education for all students, Hispanics, and all students in Texas border region.

### **Data Analysis**

To test these hypotheses, the data obtained will be analyzed using simple linear regression to determine the relationship, if any, between costs increases and student enrollment. The simple linear regression measured the relationship between a sequence of data points that are uniformly and successively spaced in time. This time element will allow the researcher to determine if the relationship between cost of attendance and enrollment, if any, changed over time. It also allowed the researcher to determine if this relationship changed significantly since the State's deregulation of tuition and fees. The dependent variable was enrollment and the primary independent variable of interest is cost of attendance. The level of statistical significance,  $p$ , for all statistical comparisons was be set at .05.

## Summary

Cost of attendance and therefore tuition pricing are important variables that affect individual participation, as demonstrated by initial enrollment, in institutions of higher education. The sensitivity of student enrollment and how it is affected by changes in price has been affirmed via research. Texas' significant Hispanic population provides an opportunity to observe how minority student participation in higher education has been affected over time. The relatively recent change authorized under HB3015, that deregulated tuition and resulted in a significant acceleration in price increases, provides an opportunity to observe changes in demand for all student types. Studies of the effect of price changes on enrollment have failed to provide observations of the effect on enrollment of Hispanic students. This is principally due to the fact that many of these studies were completed over a decade ago and were based on extremely old datasets that lacked sufficient Hispanic representation. This relationship required additional study to understand how recent acceleration in cost of attendance increases has affected participation. Additionally, tuition price increases in Texas and the nation as a whole are rising more rapidly than ever before. The State's deregulation fueled an unprecedented series of cost increases and thus provides an opportunity to determine if these increases

demonstrate a stronger or more acute relationship with enrollment.



## **Chapter 4**

### **Results**

This chapter includes a review of the purpose of the study, a description of the subjects of the study, and the results for each research question posed in Chapter 1 that provided the focus of the study.

#### **Purpose of the Study**

The purpose of this study was to determine if the legislative changes, which deregulated tuition in the State of Texas, affected enrollment behavior in public institutions of higher education. Enrollment behavior was analyzed: (1) to determine the effect, if any, of tuition and fee increases on the participation of students in Texas public higher education; (2) to determine the effect, if any, of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education; and (3) to determine the effect, if any, of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the US/Mexico border.

#### **Subjects**

This study focused on the relationship between enrollment and price increases at public four year higher education institutions in the State of Texas as defined within the Texas Education Code Title III Section 61.003. This includes Angelo

State University, Lamar University, Midwestern State University, Prairie View A & M University, Sam Houston State University, Stephen F. Austin University, Sul Ross State University, Tarleton State University, Texas A & M University, Texas A & M University at Galveston, Texas A & M University - Commerce, Texas A & M University - Kingsville, Texas Southern University, Texas State University - San Marcos, Texas Tech University, Texas Woman's University, The University of Texas at Arlington, The University of Texas at Austin, The University of Texas at El Paso, The University of Texas at San Antonio, The University of Texas - Pan American, University of Houston, University of Houston - Downtown, University of North Texas, and West Texas A & M University.

The current education code identifies additional state institutions that were not included in the study because these schools were authorized to enroll only upper division students during a portion of the time period studied. The excluded institutions are Texas A & M International University, Texas A & M University-Corpus Christi, Texas A & M University-Texarkana, The University of Texas at Brownsville, The University of Texas at Dallas, The University of Texas at Tyler, The University of Texas of the Permian Basin, University of Houston - Clear Lake, and University of Houston Victoria.

The Texas border region area, used in the study, is defined in the *Bordering the Future* study published in July 1988 by then State Comptroller John Sharp. This report defined this area as the "...Texas side of the region that snakes in a southeasterly line beginning at the New Mexico state line in Anthony and running through El Paso all the way to San Antonio along Interstate 10, then down Interstate 37 to the north side of Corpus Christi on the Texas Gulf" (Sharp, 1988, p.6). The border institutions included in the study were: The University of Texas at El Paso, Sul Ross State University, The University of Texas at San Antonio and Texas A & M University - Kingsville.

The change in enrollment trends of first-time, full-time students for the fall semester during academic years 1989 to 2006 were used as the dependent variable. Ideally, In-State resident students would be selected for this study because their enrollment decisions are more directly impacted by price increases than are the decisions of out-of-state students (Shin & Milton, 2006). However, these data are not available in the self-reported IPEDS data. First time undergraduate applicant acceptance and enrollment data reported by the THECB for the last ten years indicates that approximately 90% of all accepted students are Texas residents (THECB - Higher Education Data, N.D.). Therefore, total first-time, full-time student enrollment was used in this study. Out-of-State and international students

are included in this study and are subject to much higher tuition and fee costs than their in-State peers. Although their enrollment decisions are generally affected by factors other than cost, their low representation of approximately 10% will not have a significant effect on the results.

Before presenting the results of the study, it is important to understand the historical trends of State-wide total and Hispanic enrollments for the State as well as the border and non-border areas. The data presented below are based on the enrollment and cost of attendance information reported by the institutions included in this study for the years covered by the study. Figure 2 is a graphic representation of State-wide total enrollment trends and includes the border and non-border enrollment trends for the institutions included in the study.

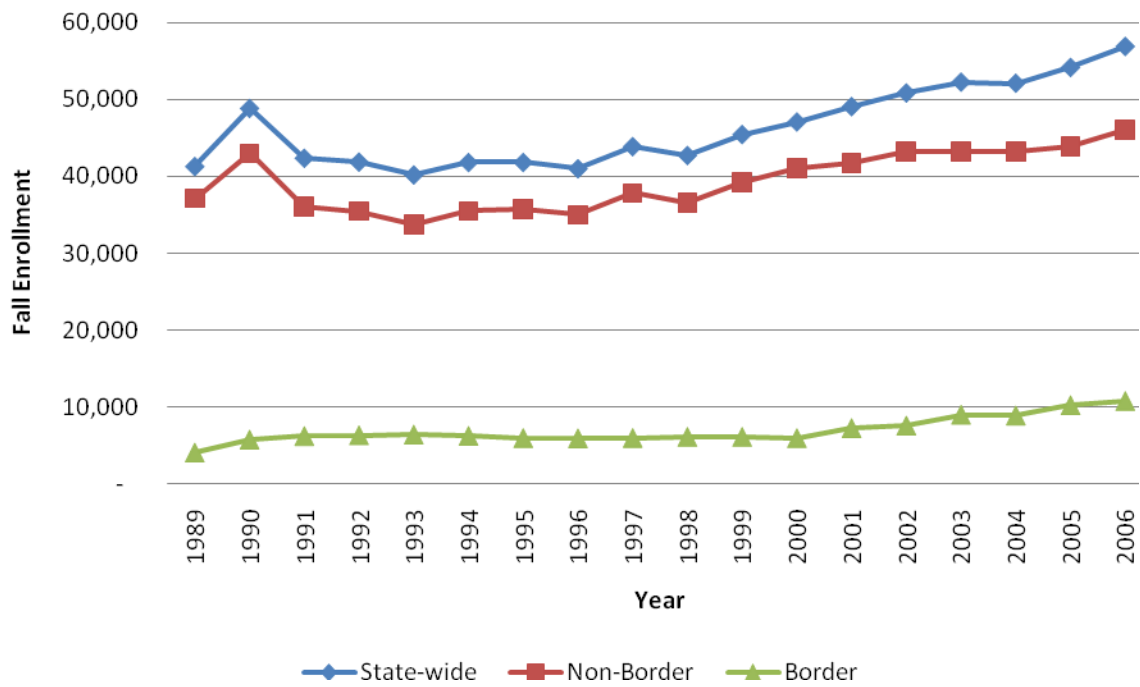


Figure 2. State of Texas enrollment trends.

Figure 3 is a graphic representation of State-wide Hispanic enrollment trends and includes Hispanic enrollment trends for the border and non-border institutions included in the study.

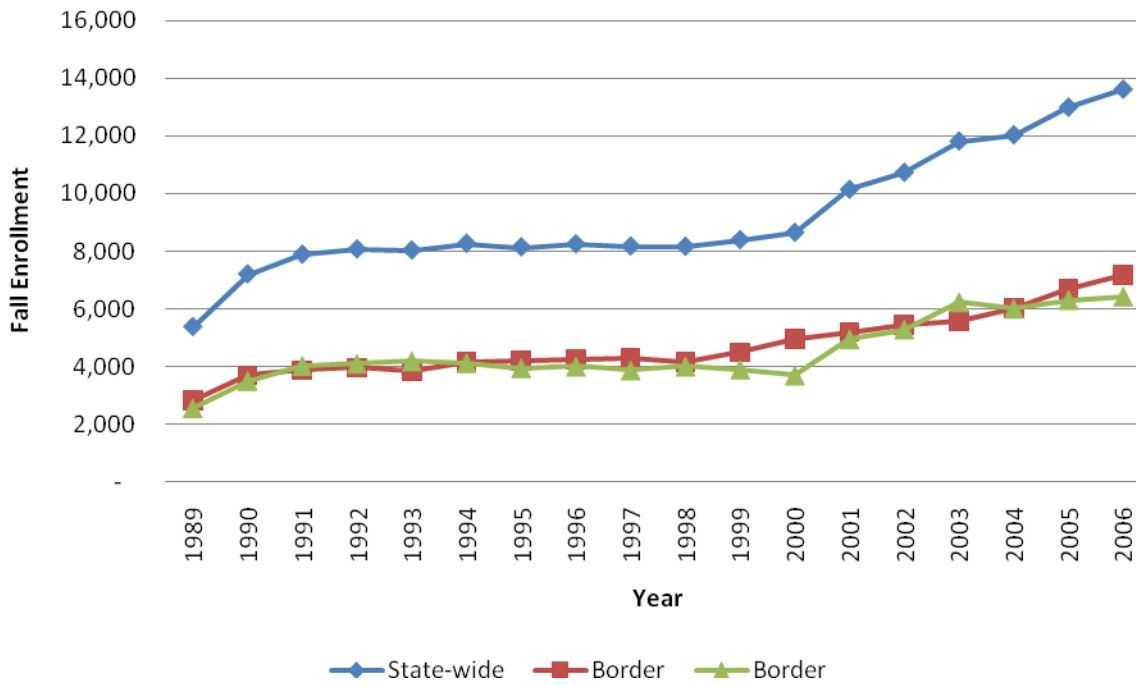


Figure 3. State of Texas Hispanic enrollment trends.

Figures 2 & 3 show that total State-wide enrollment grew at an average rate of 2% per year between 1989 and 2006. Enrollment in non-border institutions grew at an average rate of 1.5% while enrollment in border institutions grew at an average rate of 6.2%. State-wide Hispanic enrollment grew at a rate of 5.9%, with 5.5% enrollment growth in non-border institutions and 6% enrollment growth in border institutions. Enrollment growth in the period immediately following deregulation of tuition was higher than the historical average at 2.9% for total State-wide enrollment, with 1.6% and 9.2% at non-border and border institutions, respectively, between 2003 and 2006. State-wide

Hispanic enrollment was 6%, with 7.2% and 5% at non-border and border institutions respectively, between 2003 and 2006.

Figure 4 is a graphic representation of State-wide average cost of attendance for all institutions and includes the average cost of attendance for the border and non-border institutions included in the study.

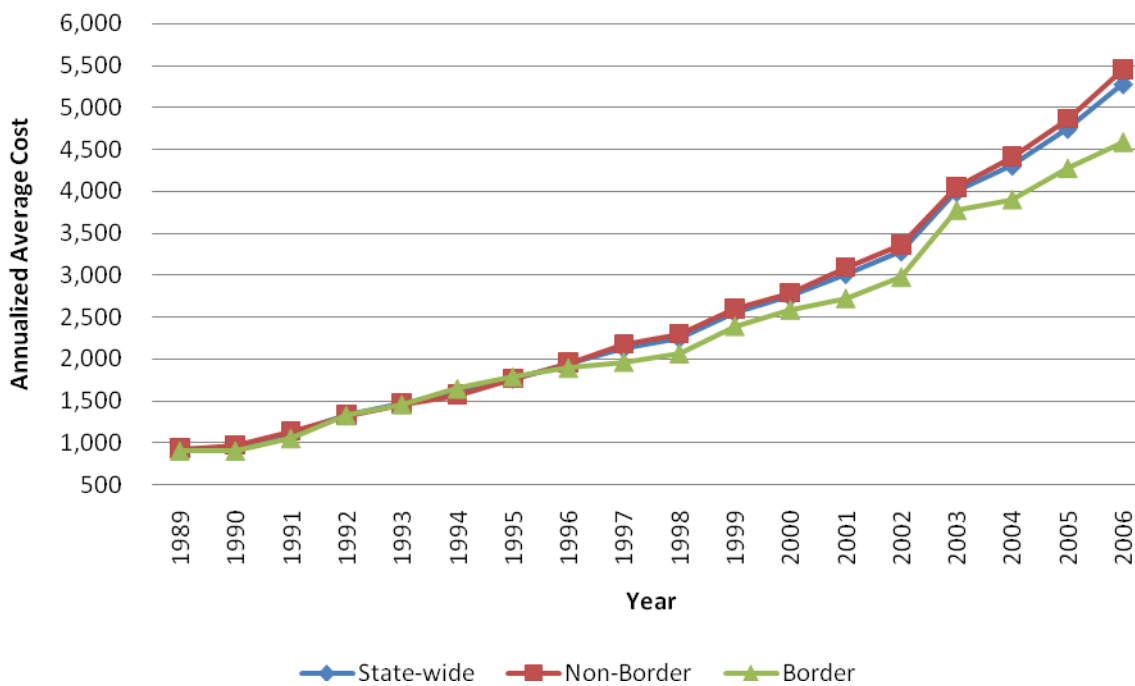


Figure 4. State of Texas average cost of attendance.

This figure indicates that the state-wide average cost of attendance increased at a rate of 10.5% during the period of the study, and at a relatively slightly higher rate of 12.7% from 2003 to 2006. The average cost of attendance at non-border schools was 11% during the entire study period and 12.9% from

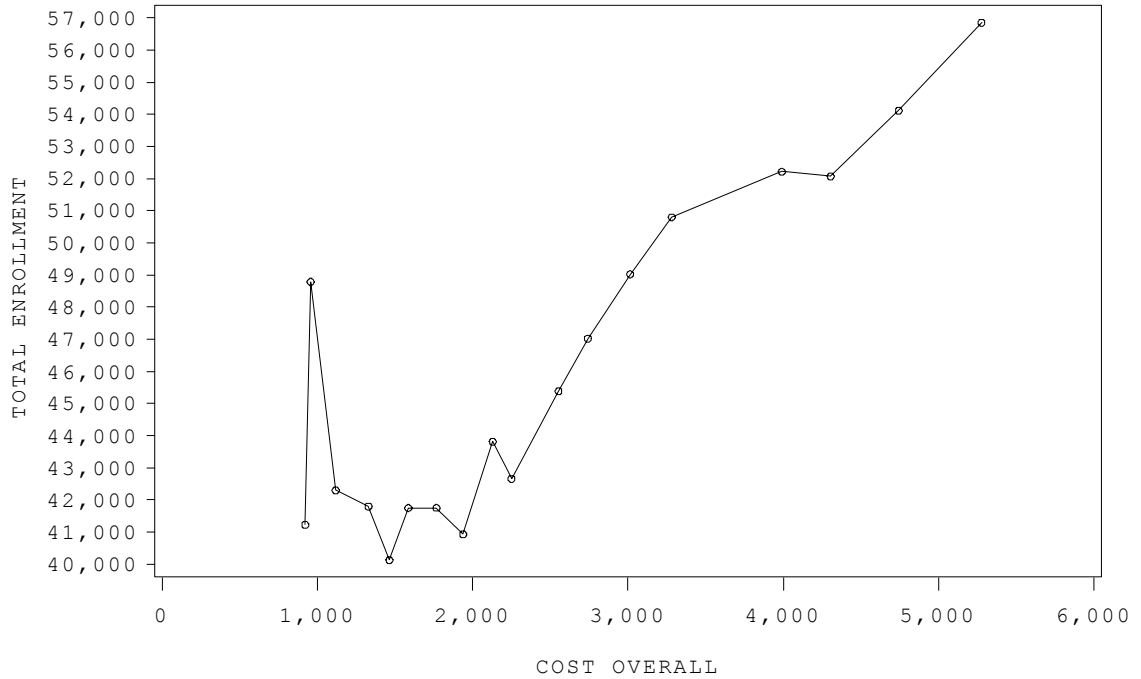
2003 to 2006. Cost of attendance increases at border institutions were 10% during the entire study period and were only slightly higher, at 11.5%, from 2003 to 2006. While average cost of attendance increased at substantially the same percentage rate in all geographical areas studied, the average dollar increase varied. The average dollar increase for all non-border institutions was \$2,092, for border institutions this increase was \$810, while the State-wide average was \$1,995.

### **Research Questions**

Research Question #1: *What is the effect, if any, of tuition and fee increases on the participation of students in Texas public higher education?*

Figure 5 presents the change in state-wide total enrollment versus increases in the state-wide average cost of attendance.

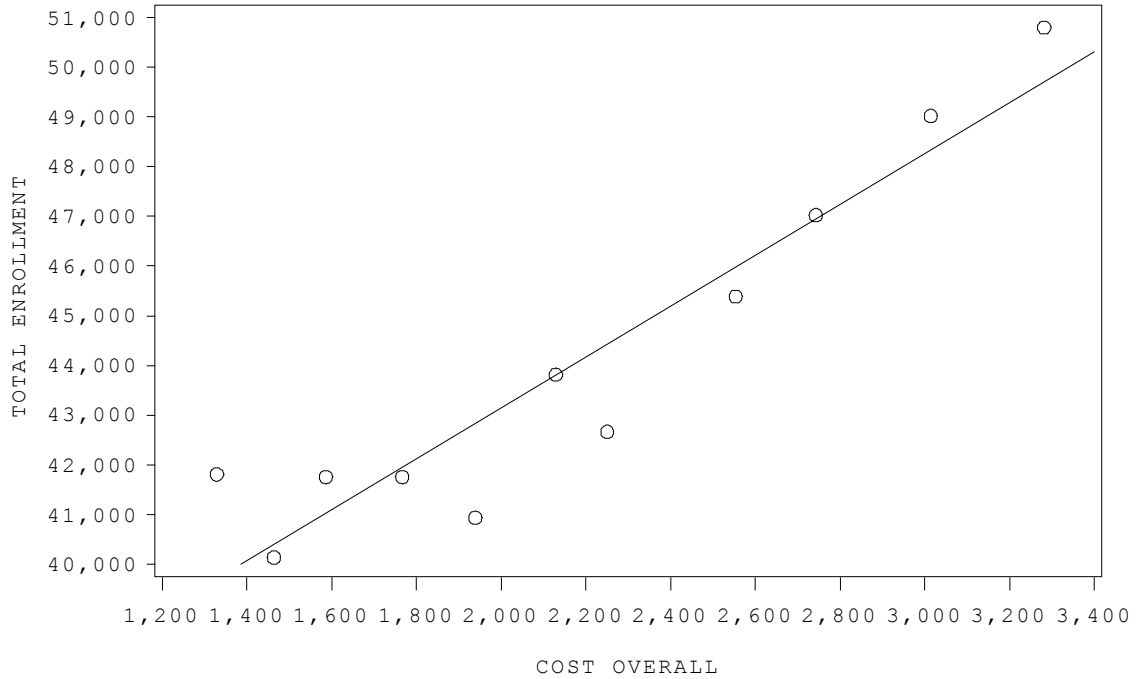




*Figure 5.* State-wide enrollment versus average cost of attendance.

Figure 5 is a graphical representation of the relationship between the state-wide values for the dependent variable Enrollment and the independent variable Cost of Attendance. The researcher noted a positive relationship between enrollment and cost for a majority of the years included in the study.

Figure 6 is a fitted line plot of the relationship between state-wide values for enrollment and cost from 1992 to 2002.



*Figure 6.* Simple linear regression of state-wide enrollment versus statewide average cost of attendance.

The institutionally reported data reported in Figure 5 reflected a relative peak in enrollment for year 1990. Therefore the researcher explored the relationship of Enrollment and Cost, from years 1992 to 2002 only, in the Simple Linear Regression (SLR) model to predict enrollment for 2003 to 2006.

Table 1 presents the results of the t test of the SLR model of state-wide enrollment to state-wide average cost of attendance.

Table 1.

*Simple Linear Regression results of t test for State-wide Enrollment versus Average Cost.*

| Variable     | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|--------------|----|----------|----------------|---------|----------------|
| Intercept    | 1  | 32912    | 1372           | 23.98   | <.0001         |
| Overall Cost | 1  | 5.1162   | 0.6038         | 8.47    | <.0001 *       |

The relationship between enrollment and cost of attendance is significant and the analysis suggests that for every \$100 increase in Overall Cost, there is a corresponding increase in Enrollment of approximately 512 students. Table 2 provides the 95% confidence interval for the state-wide Predicted Enrollment based on the SLR model.

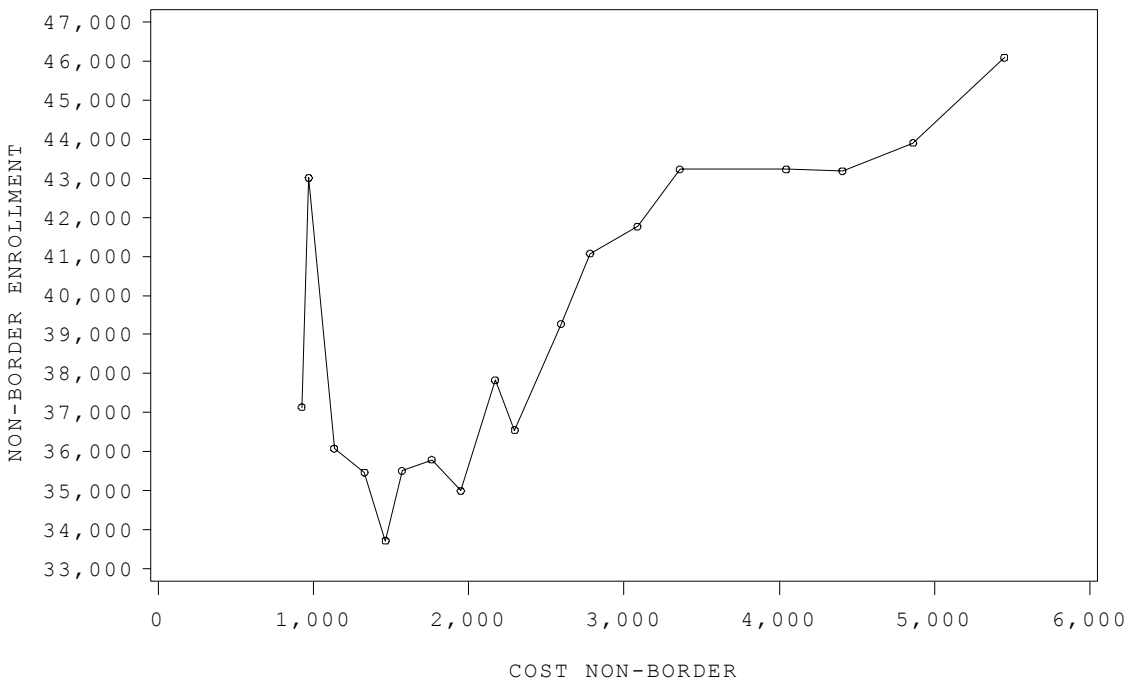
Table 2.

*Predicted State-wide Enrollment Based on SLR Model.*

| Year | Actual Total Enrollment | Predicted Total Enrollment | 95% Lower Confidence Limit | 95% Upper Confidence Limit |
|------|-------------------------|----------------------------|----------------------------|----------------------------|
| 2003 | 52,214                  | 53,334.05                  | 49,511.53                  | 57,156.56                  |
| 2004 | 52,073                  | 54,942.59                  | 50,830.08                  | 59,055.09                  |
| 2005 | 54,120                  | 57,183.49                  | 52,630.12                  | 61,736.85                  |
| 2006 | 56,857                  | 59,915.14                  | 54,781.09                  | 65,049.18                  |

The researcher noted that actual total state-wide enrollment for all periods proceeding deregulation are contained within the 95% Confidence Interval, although actual enrollment is below the predicted enrollment.

Figure 7 presents the change in total enrollment of all students in non-border institutions versus increases in the average cost of attendance at non-border institutions.

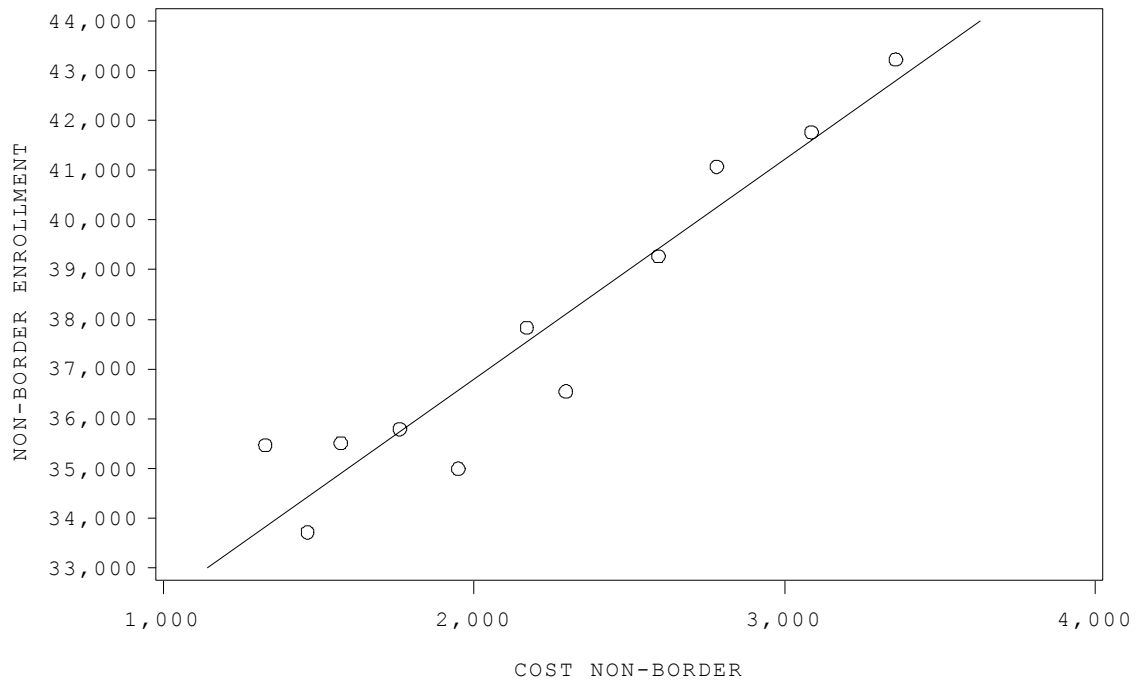


*Figure 7.* Enrollment versus average cost at non-border institutions.

Figure 7 is a graphical representation of the relationship between the non-border institution's values for the dependent variable Enrollment and the independent variable Cost of Attendance. The researcher noted a significant positive

relationship between enrollment and cost for a majority of the years included in the study.

Figure 8 is a fitted line plot of the relationship between non-border values for enrollment and cost of attendance from 1992 to 2002.



*Figure 8.* Simple linear regression of enrollment versus average cost at non-border institutions.

The institutionally reported data in Figure 6 reflected a relative peak in enrollment for year 1990. Therefore the researcher explored the relationship of Enrollment and Cost, from years 1992 to 2002 only, in the SLR model to predict enrollment for 2003 to 2006.

Table 3 reflects the results of the t test from the SLR model of non-border enrollment to non-border average cost of attendance.

Table 3.

*Simple Linear Regression results of t test for Non-border Enrollment versus Cost.*

| Variable        | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|-----------------|----|----------|----------------|---------|----------------|
| Intercept       | 1  | 27956    | 1107           | 25.26   | <.0001         |
| Non-Border Cost | 1  | 4.4194   | 0.4797         | 9.21    | <.0001 *       |

The analysis suggests that for every \$100 increase in Overall Cost, there is a corresponding increase in Enrollment of approximately 442 students.

Table 4 provides the 95% confidence interval for the non-border Predicted Enrollment.

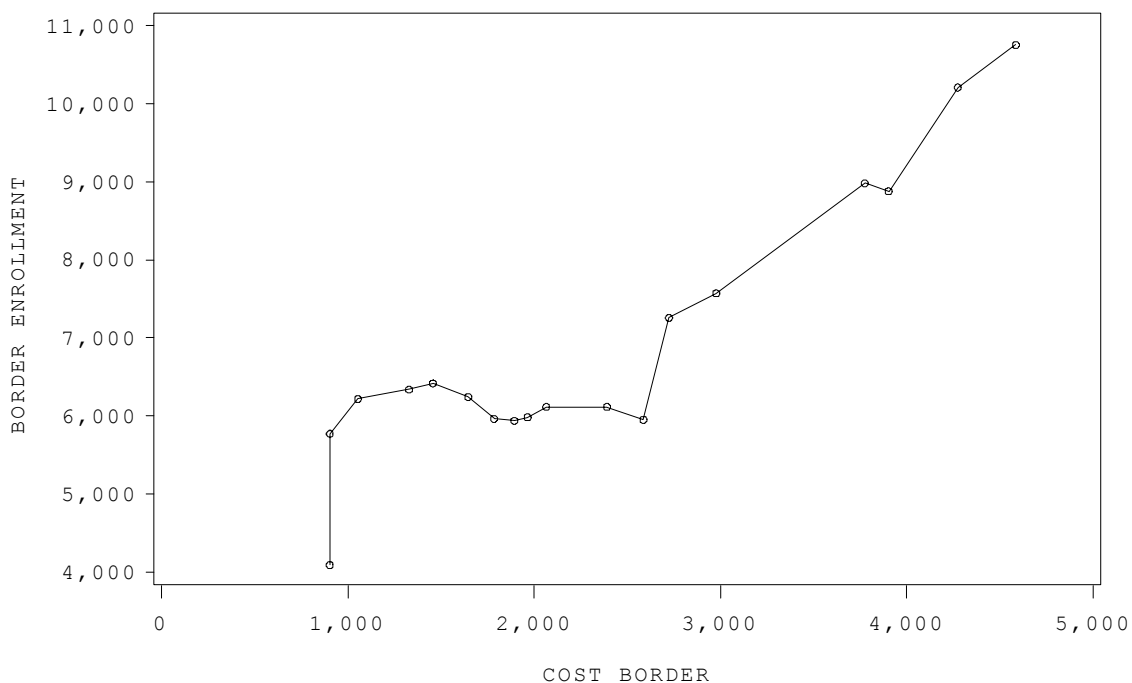
Table 4.

*Predicted Non-Border Enrollment Based on SLR Model.*

| YEAR | Actual Non-Border Enrollment | Predicted Non-Border Enrollment | 95% Lower Confidence Limit | 95% Upper Confidence Limit |
|------|------------------------------|---------------------------------|----------------------------|----------------------------|
| 2003 | 43,231                       | 45,836.00                       | 42,700.80                  | 48,971.20                  |
| 2004 | 43,193                       | 47,432.08                       | 44,035.07                  | 50,829.09                  |
| 2005 | 43,909                       | 49,440.94                       | 45,682.11                  | 53,199.76                  |
| 2006 | 46,102                       | 52,046.86                       | 47,779.27                  | 56,314.44                  |

The researcher noted that actual non-border enrollment was contained within the 95% confidence interval for 2003 but not contained within the 95% Confidence Interval for 2004-2006. Further, actual enrollment was lower than predicated enrollment in all years.

Figure 9 presents the change in total enrollment of all students in border institutions versus increases in the average cost of attendance at border institutions.



*Figure 9.* Enrollment versus average cost at border institutions.

Figure 9 is a graphical representation of the relationship between the border institution's values for the dependent variable Enrollment and the independent variable Cost of

Attendance. The researcher noted a positive relationship between enrollment and cost for a majority of the years included in the study.

Figure 10 is a fitted line plot of the relationship between border institution values for enrollment and cost from 1992 to 2002.

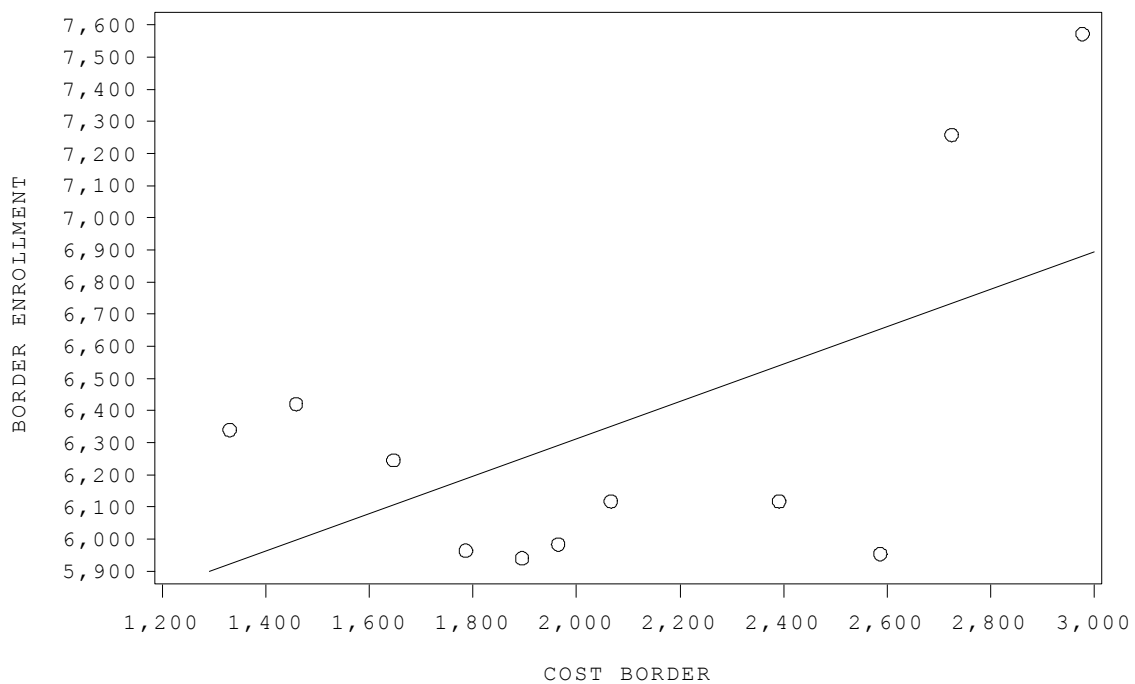


Figure 10. Simple linear regression of enrollment versus average cost at border institutions.

The institutionally reported data did not reflect any significant linear relationship as reflected by the plot point distance from the fitted line and the result of the t test reported in Table 5.



Table 5.

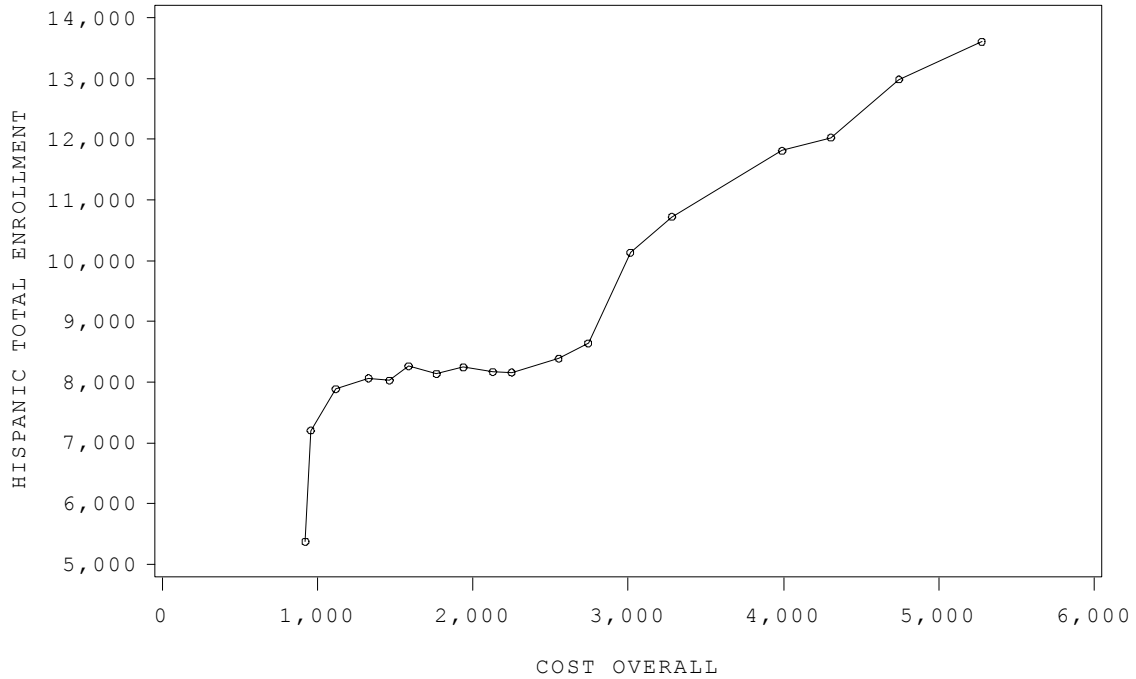
*Simple Linear Regression results of t test for Border Enrollment versus Cost.*

| Variable    | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|-------------|----|----------|----------------|---------|----------------|
| Intercept   | 1  | 5151     | 610.157        | 8.44    | <.0001         |
| Border Cost | 1  | 0.5805   | 0.2855         | 2.03    | 0.0726 ns      |

Due to the lack of a significant relationship, the researcher was not able to test the effect of cost deregulation on border enrollment for years 2003-2006.

Research Question #2: *What is the effect, if any, of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education?*

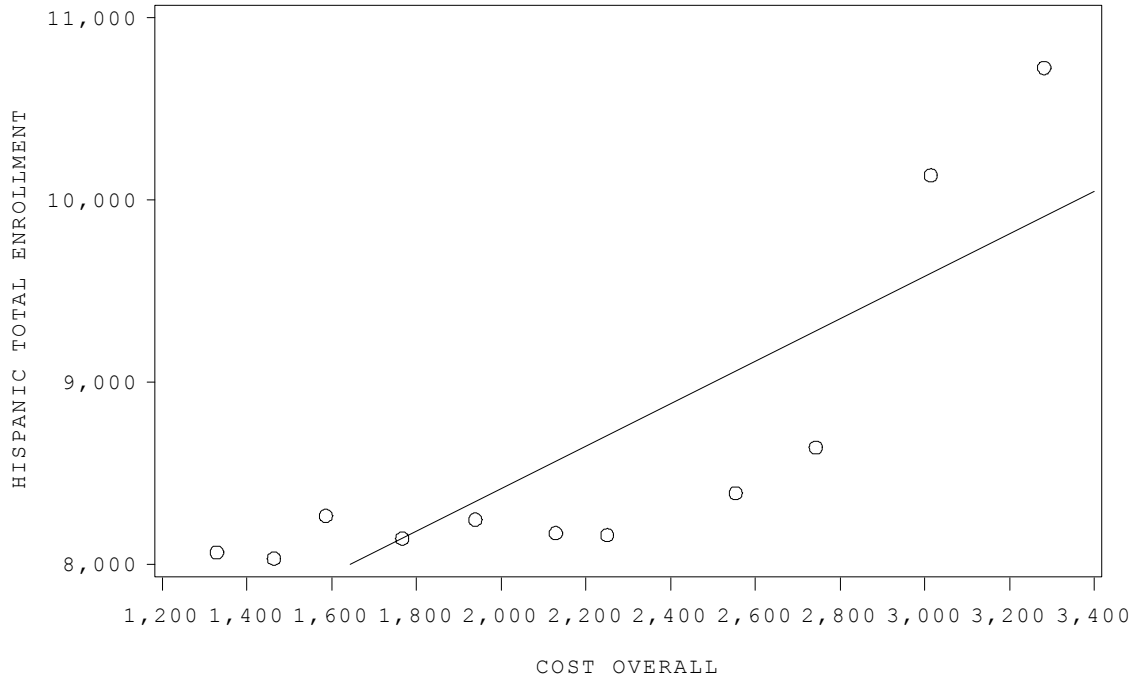
Figure 11 presents the change in Hispanic total enrollment versus increases in state-wide average cost of attendance.



*Figure 11.* State-wide Hispanic enrollment versus average cost.

To ensure consistency in methodology the researcher explored the relationship of Enrollment and Cost for Hispanics, from years 1992 to 2002 only, in the SLR.

Figure 12 is a fitted line plot of the relationship between Hispanic values for total enrollment and state-wide average cost from 1992 to 2002.



*Figure 12.* Simple linear regression of state-wide Hispanic enrollment versus average cost.

The researcher observed a significant relationship between the variables in the institutionally reported data, but the data did not reflect a linear relationship as reflected by the plot point distance from the fitted line and the result of the t test reported in Table 6.

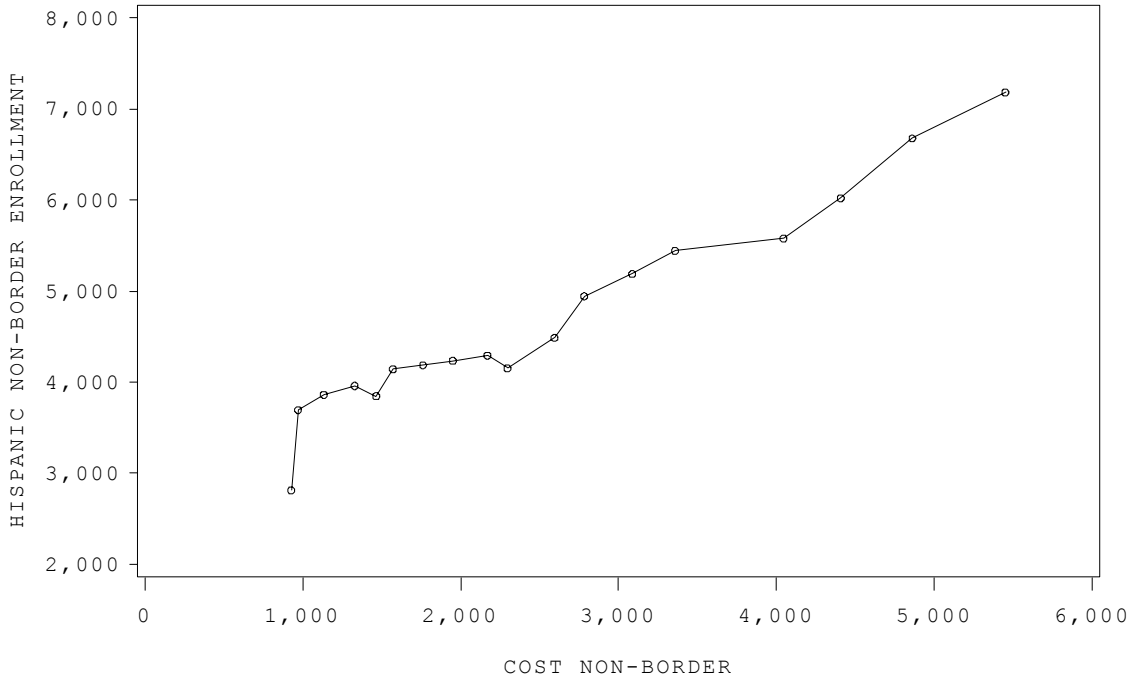
Table 6.

*Simple Linear Regression results of t test for State-wide  
Hispanic Enrollment versus Cost.*

| Variable        | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|-----------------|----|----------|----------------|---------|----------------|
| Intercept       | 1  | 6083     | 600.3101       | 10.13   | <.0001         |
| State-Wide Cost | 1  | 1.1664   | 0.2641         | 4.42    | 0.0017 *       |

The results reported in Table 6 reflect that while the effect is significant there seems to be no linear relationship between the variables in the above graph as denoted by the flat trend, except for the last four points. The researcher was not able to test the effect of deregulation on Hispanic total enrollment for years 2003-2006. The researcher considered fitting a curved line rather than a flat line, but determined that the enrollment predictions rendered by a curved line, for future periods, would not be appropriate for the study.

Figure 13 presents the change in Hispanic enrollment in non-border institutions versus increases in non-border institution average cost of attendance.



*Figure 13.* Hispanic enrollment in non-border institutions versus average cost.

To ensure consistency in methodology the researcher explored the relationship of Enrollment and Cost for Hispanics, from years 1992 to 2002 only, in the SLR.

Figure 14 is a fitted line plot of the relationship between Hispanic values for non-border institution enrollment and non-border institution average cost from 1992 to 2002.

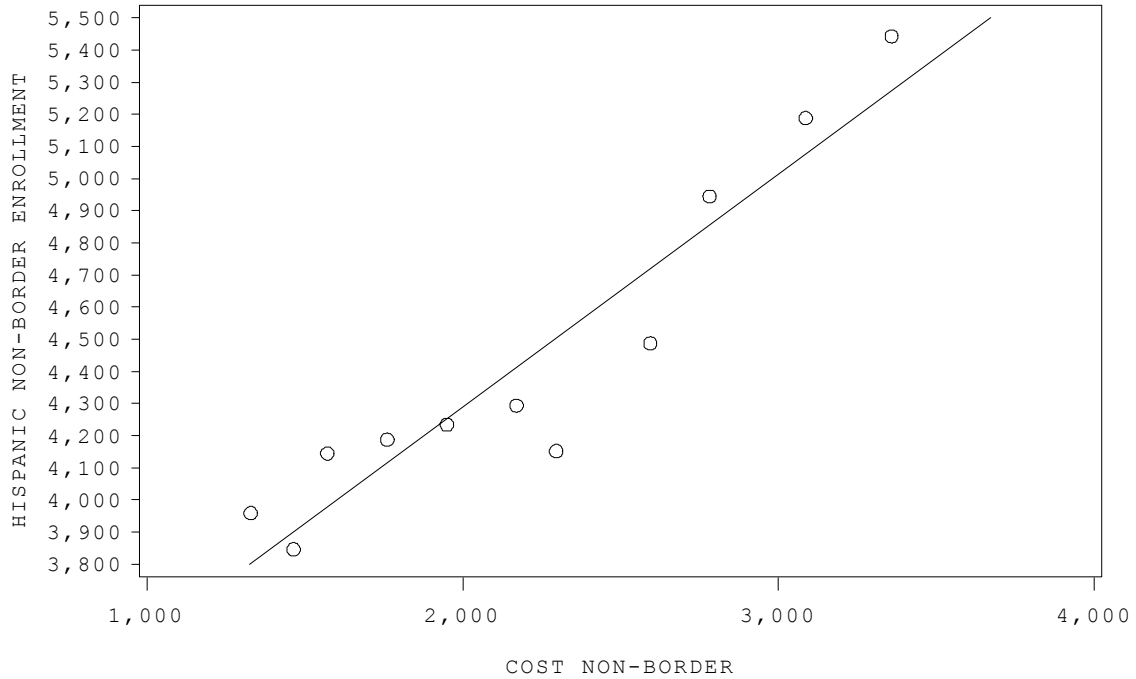


Figure 14. Simple linear regression of Hispanic enrollment in non-border institutions versus average cost.

Table 7 reflects the results of the t test from the SLR model of Hispanic non-border enrollment to non-border average cost of attendance.

Table 7.

*Simple Linear Regression results of t test for Hispanic Non-border Enrollment versus Cost.*

| Variable        | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|-----------------|----|----------|----------------|---------|----------------|
| Intercept       | 1  | 2840     | 197.1741       | 14.41   | <.0001         |
| Non-Border Cost | 1  | 0.724    | 0.0855         | 8.47    | <.0001 *       |

The researcher observed a significant relationship and the analysis suggests that for every \$100 increase in Overall Cost, there is a corresponding increase in Enrollment of approximately 72 students.

Table 8 provides the 95% confidence interval for Hispanic non-border predicted enrollment.

Table 8.

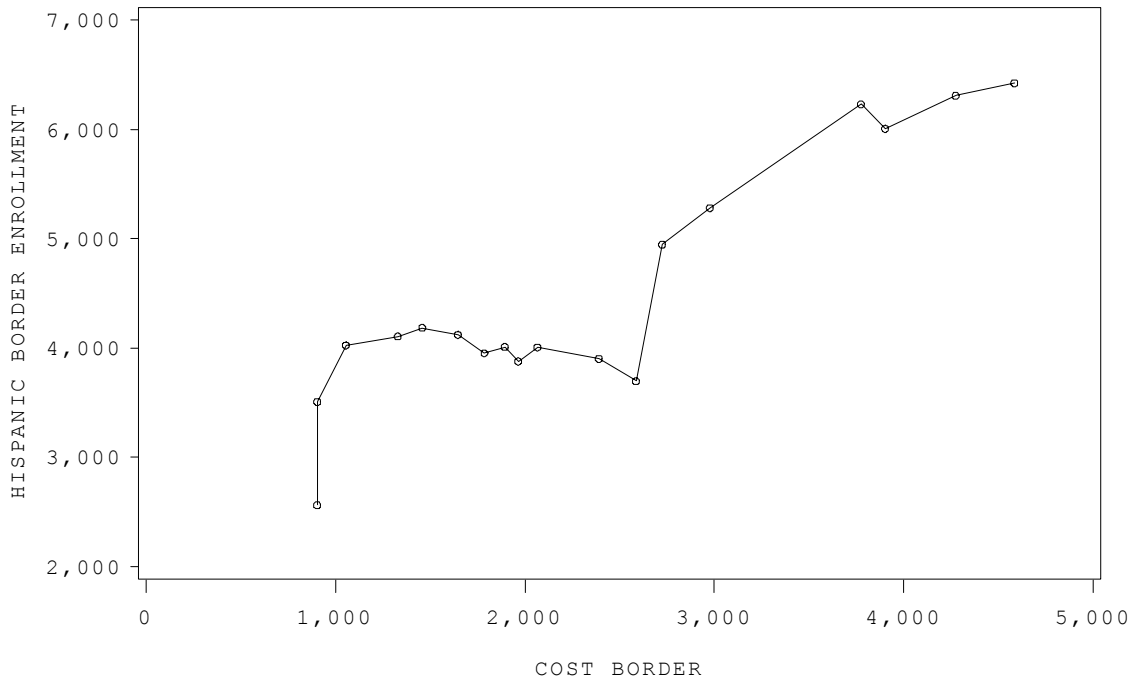
*Predicted Hispanic Non-Border Enrollment Based on SLR Model.*

| YEAR | Actual Hispanic Non-Border Enrollment | Predicted Hispanic Non-Border Enrollment | 95% Lower Confidence Limit | 95% Upper Confidence Limit |
|------|---------------------------------------|--|----------------------------|----------------------------|
| 2003 | 5,579                                 | 5,769.41                                 | 5,210.89                   | 6,327.92                   |
| 2004 | 6,021                                 | 6,030.87                                 | 5,425.71                   | 6,636.02                   |
| 2005 | 6,678                                 | 6,359.95                                 | 5,690.34                   | 7,029.56                   |
| 2006 | 7,182                                 | 6,786.84                                 | 6,026.60                   | 7,547.08                   |

The researcher noted that actual Hispanic non-border enrollment is contained within the 95% confidence interval for 2003-2006. Actual enrollment was lower than predicted enrollment for 2003 and 2004, but exceeded predictions for 2005 and 2006.

Research Question #3: *What is the effect, if any, of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the US/Mexico border?*

Figure 15 presents the change in Hispanic border enrollment versus increases in average cost of attendance at border institutions.



*Figure 15.* Hispanic enrollment in border institutions versus average cost.

To ensure consistency in methodology the researcher explored the relationship of Enrollment and Cost for Hispanics, from years 1992 to 2002 only, in the SLR.

Figure 16 is a fitted line plot of the relationship between Hispanic values for border enrollment and border average cost of attendance from 1992 to 2002.



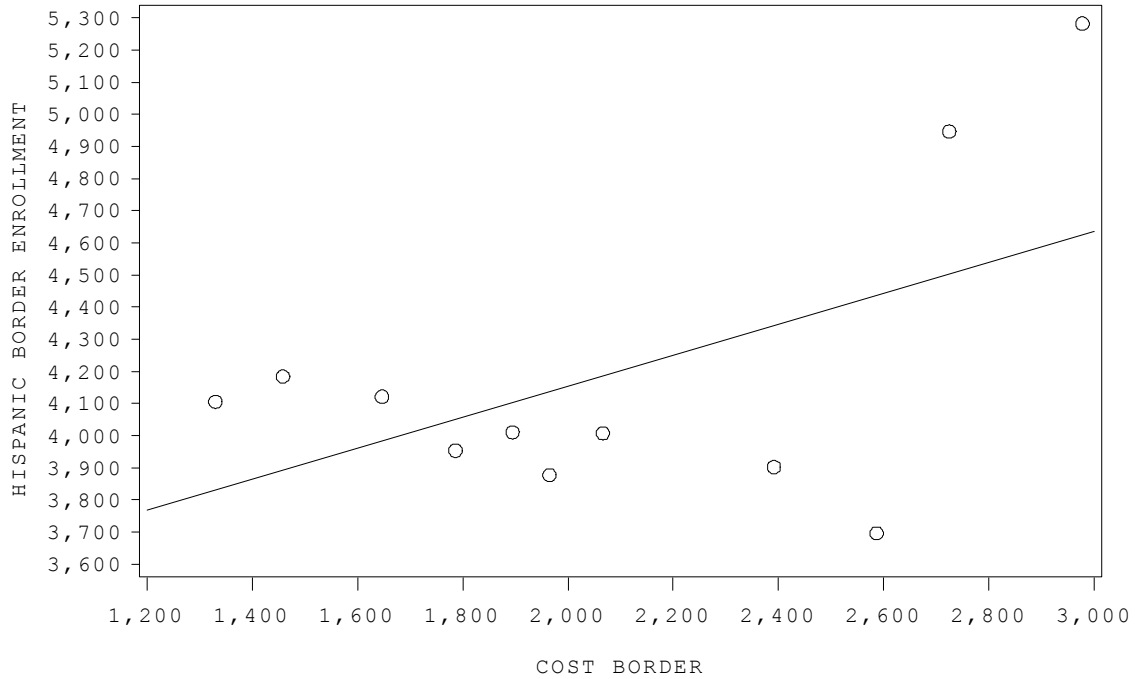


Figure 16. Simple linear regression of Hispanic enrollment in non-border institutions versus average cost.

The institutionally reported data did not reflect any significant linear relationship as reflected by the plot point distance from the fitted line and the result of the t test reported in Table 9.

Table 9.

*Simple Linear Regression results of t test for Hispanic Border Enrollment versus Cost.*

| Variable    | DF | Estimate | Standard Error | t Value | Approx Pr >  t |
|-------------|----|----------|----------------|---------|----------------|
| Intercept   | 1  | 3194     | 545.1829       | 5.86    | 0.0002         |
| Border Cost | 1  | 0.4801   | 0.2551         | 1.88    | 0.0925 ns      |

Due to the lack of a significant relationship, the researcher was not able to test the effect of cost deregulation on border enrollment for years 2003-2006.

## **Chapter 5**

### **Discussion**

Chapter 5 contains a summary of the study, including the purpose of the study, research questions, and a description of the methodology; conclusions based on the results of the study presented in Chapter 4; links to the extant literature presented in Chapter 2; recommendations for further research; and implications for practice.

### **Summary**

The purpose of this study was to determine if the legislative changes, which deregulated tuition in the State of Texas, affected enrollment behavior in public institutions of higher education. The following research questions guided this study:

- 4) What is the effect of tuition and fee increases on participation of students in Texas public higher education?
- 5) What is the effect of tuition and fee increases on the participation of historically under-represented minority students in Texas public higher education?
- 6) What is the effect of tuition and fee increases on the participation of Hispanic students at Texas public higher education institutions located on the U.S./Mexico border?

These research questions were explored by analyzing the relationship between enrollment and price increases at public four year higher education institutions in the State of Texas as defined within the Texas Education Code Title III Section 61.003. This includes Angelo State University, Lamar University, Midwestern State University, Prairie View A & M University, Sam Houston State University, Stephen F. Austin University, Sul Ross State University, Tarleton State University, Texas A & M University, Texas A & M University at Galveston, Texas A & M University - Commerce, Texas A & M University - Kingsville, Texas Southern University, Texas State University - San Marcos, Texas Tech University, Texas Woman's University, The University of Texas at Arlington, The University of Texas at Austin, The University of Texas at El Paso, The University of Texas at San Antonio, The University of Texas - Pan American, University of Houston, University of Houston - Downtown, University of North Texas and West Texas A & M University.

The current education code identifies additional state institutions that were not included in the study because these institutions were only authorized to enroll upper division students during a portion of the time period studied. The excluded institutions are Texas A & M International University, Texas A & M University - Corpus Christi, Texas A & M University

- Texarkana, The University of Texas at Brownsville, The University of Texas at Dallas, The University of Texas at Tyler, The University of Texas of the Permian Basin, University of Houston - Clear Lake, and University of Houston Victoria.

The Texas border region institutions included in this study are those located in the area defined in the Bordering the Future study published in July 1988 by then State Comptroller John Sharp. This report defined this area as the "...Texas side of the region that snakes in a southeasterly line beginning at the New Mexico state line in Anthony and running through El Paso all the way to San Antonio along Interstate 10, then down Interstate 37 to the north side of Corpus Christi on the Texas Gulf" (Sharp, 1988, p.6). The border institutions included in the study were: The University of Texas at El Paso, Sul Ross State University, The University of Texas at San Antonio and Texas A & M University - Kingsville.

The change in enrollment trends of first-time, full-time students for the fall semester during academic years 1989 to 2006 were used as the dependent variable. Ideally, In-State resident students would be selected for this study because their enrollment decisions are more directly impacted by price increases than are the decisions of out-of-state students (Shin & Milton, 2006). However, these data are not available in the self-reported IPEDS data. First time undergraduate applicant

acceptance and enrollment data reported by the THECB for the last ten years indicates that approximately 90% of all accepted students are Texas residents (THECB - Higher Education Data, n.d.). Therefore, total first-time, full-time student enrollment was used in this study. Out-of-State and international students are included in this study and are subject to much higher tuition and fee costs than their in-State peers. Although their enrollment decisions are generally affected by factors other than cost, their low representation of approximately 10% will not have a significant effect on the results.

Participant data for this study were collected from the Integrated Postsecondary Education Data System (IPEDS) as reported by individual institutions to the National Center for Education Statistics (NCES-IPEDS). "IPEDS is the core postsecondary education data collection program for NCES. Data are collected from all primary providers of postsecondary education in the country in areas including enrollments, program completions, graduation rates, faculty, staff, finances, institutional prices, and student financial aid" (NCES-IPEDS). These data are made available to the general public via multi functional data mining tools. The Higher Education Act of 1992 mandated reporting and participation in this annual survey by all institutions that participate in federal student financial aid programs authorized under Title IV of the Higher Education

Act of 1965. While participation prior to 1993 was not mandatory, all of the institutions included in this study voluntarily reported enrollment and cost of attendance data for the years included in the study prior to this mandate. IPEDS defines the enrollment data element as "attendance or performance in an instructional activity (course or program) that can be applied by a recipient toward the requirements for a degree, diploma, certificate, or other formal award" (NCES-IPEDS). This study is limited by the accuracy of State enrollment data and cost data that is self reported by individual institutions.

Prior to conducting this study, approval was sought from the Institutional Review Board (IRB) of the University of Texas at El Paso (See Appendix A). All university policies and procedures were followed. As per IRB guidelines, approval was requested for exempt status. This study involved the review of existing data and records from sources that were publicly available. Additionally, all data existed prior to the beginning of the research.

The study was based on the economic theories related to supply and demand. Student demand for higher education is rooted in human capital investment models and in this study demand is expressed in terms of enrollment behavior changes relative to changes in price. Economic models offer powerful theories and

tools that support policy analysis generally and educational policy specifically. Economic theories are often assumed to be strictly concerned with financial and other business issues, however its structure and methodology are heavily rooted in a social and behavioral science (Paulsen & Toutkoushian, 2008).

### **Conclusions**

Regarding the first research question of whether or not a significant relationship existed between State-wide enrollment trends and cost of attendance increases in a post deregulation environment, the evidence indicates that a positive relationship exists between the dependent and independent variable. In general the researcher found that State-wide enrollment continued to increase in all public four year institutions in the post deregulation periods. The researcher was unable to compare enrollment growth rates to overall population growth rates in the State because the enrollment data availability did not include sufficient points for comparison to the National Census decade based measurement and reporting.

The researcher further found that for every \$100 increase in cost an estimated 512 additional students were predicted to enroll based on historical enrollment behavior between 1992 and 2002. The actual enrollment for 2003 through 2006 was found to be within the 95% confidence intervals of the SLR enrollment prediction model. Based on these observations, the researcher



rejected the directional hypothesis and accepted the null hypothesis.

The researcher studied the relationship between enrollment and cost of attendance in selected institutions that were located in areas outside the border area. The researcher determined that State-wide enrollment trends, of non-border institutions, had a significant positive relationship to cost increases at these institutions. The researcher further found that for every \$100 increase in cost an estimated 442 additional students were predicted to enroll based on historical enrollment behavior between 1992 and 2002. The actual enrollment for 2003 through 2006 was found to be within the 95% confidence intervals of the SLR enrollment prediction model. Based on these observations, the researcher rejected the directional hypothesis and accepted the null hypothesis.

The researcher studied the relationship between total enrollment and cost of attendance in selected institutions that were located in the border area. The researcher did not find a significant relationship between total enrollment trends, of non-border institutions and cost increases at these institutions. Due to a lack of significance and linearity, the researcher was unable to test his hypotheses. These results are consistent with the demographic statistics that indicated State-wide enrollment growth of 2% for all years covered in the study

and 2.9% during the period subsequent to deregulation. These results are inconsistent with demand theory and the researcher speculates that factors other than cost are affecting student enrollment behavior.

Regarding the second research question of whether or not a significant relationship existed between State-wide enrollment trends of Hispanics and cost of attendance increases in a post deregulation environment, the evidence produced the following results. The researcher observed a significant relationship between State-wide Hispanic enrollment trends at all institutions and cost increases at these institutions. However, due to a lack of linearity, the researcher was unable to compare predicted enrollment to actual enrollment.

The researcher studied the relationship between Hispanic enrollment and cost of attendance in selected institutions that were located in areas outside the border area. The researcher determined that Hispanic enrollment trends, of non-border institutions, had a significant positive relationship to cost increases at these institutions. The researcher further found that for every \$100 increase in cost an estimated 72 additional students were predicted to enroll based on historical enrollment behavior between 1992 and 2002. The actual enrollment for 2003 through 2006 was found to be within the 95% confidence intervals of the SLR enrollment prediction model. Based on these

observations, the researcher rejected the directional hypothesis and accepted the null hypothesis. These results are consistent with the demographic statistics that indicated State-wide Hispanic enrollment growth of 5.9% for all years covered in the study and 4.9% during the period subsequent to deregulation. These results are inconsistent with demand theory and the researcher speculates that factors other than cost are affecting student enrollment behavior.

Regarding the third research question of whether or not a significant relationship existed between border institution enrollment trends of Hispanics and cost of attendance increases in a post deregulation environment, the evidence indicated no significant statistical or linear relationship. Due to a lack of linearity, the researcher was unable to compare predicted enrollment to actual enrollment. However the demographic statistics reflected a 6.2% enrollment growth rate from 1989 to 2006 and a decline to approximately 5% from 2003 to 2006. This decline in the enrollment growth rate suggests that Hispanics that enroll in border institutions are more sensitive to price increases than Hispanics enrolling in other institutions.

#### **Links to the Extant Literature**

This researcher's findings are inconsistent with similar enrollment studies conducted. Leslie and Brinkman's (1987) meta-analysis included twenty-five studies of the relationship

between price and college enrollment that were published between 1967 and 1982, including both cross-sectional (five) and time-series (twenty) analyses. Cross-sectional studies form a class of research methods that revolve around the observation of a subset of a population to allow for the comparison of groups, within this population, and their behavior with respect to independent variables. Cross-sectional studies are typically limited to observing behavior at a single point in time and therefore provide a snapshot of the frequency and characteristics of population behavior toward an independent variable(s). These cross-sectional studies have included studies to examine how recent high school graduates behave in the face of various postsecondary options (Heller, 1999). Researchers have also used multivariate analysis on datasets such as the High School and Beyond Survey to measure the relationship between tuition, financial aid, and other factors and student enrollment decisions (Heller, 1999). These types of studies are usually conducted with large sample sizes and therefore provide stronger statistical correlations for the subsets of data (Heller, 1999).

Heller (1997) updated the Leslie and Brinkman (1987) meta-analysis by incorporating findings from several quantitative studies which were conducted between 1987 and 1997. These studies were based on later cohorts and incorporated additional

variables such as socio-economic status (SES), financial aid, and race. The studies added in this subsequent review also filled in methodological gaps left by earlier studies and used both cross-sectional and time-series methodologies (similar to the original studies) (Heller 1997). The studies were based on data collected by the following longitudinal and static survey tools: National Longitudinal Survey of Youth (NLSY), National Longitudinal Survey of 1972 (NLS72), High School and Beyond (HSB), Current Population Surveys (CPS), Integrated Postsecondary Education Data System (IPED), and American Freshman Survey. Both the Heller and Leslie and Brinkman reviews are meta-analyses of the quantitative studies. In general, in all studies included in both the Leslie and Brinkman and Heller analyses, researchers found a common inverse relationship between price and student enrollment (Leslie and Brinkman, 1987; Heller, 1999).

The results reported by this researcher suggest that factors other than cost may have affected enrollment behavior during the period under study. The period covered in this study was affected by significant changes in the number of financial aid programs and the amounts awarded by these programs. The Tax Reform Act of 1997 (TRA97) included several reforms to the tax code and created additional post-secondary education opportunities through the creation of the Hope Scholarship

Credit and the Lifetime Learning Credit. The Hope Credit provided a \$1,500 non-refundable tax credit to qualifying students who incur out-of-pocket tuition and fee costs in their first two years in college. Similarly, the Texas Legislature created and funded the Texas Grant program to provide a \$3,500 per year grant to students who demonstrate financial need and have completed the recommended high school curriculum. The Texas Grant and Hope Credit are in addition to federal financial aid or merit based scholarships that a student is eligible to receive. These programs preceded tuition deregulation and may have positively impacted student enrollment as they served to reduce the out-of-pocket cost of attendance.

These programs have served to increase student subsidies, which resulted in a reduction in net price and have substantially the same effect as a tuition reduction (Leslie & Brinkman, 1987). Research findings with respect to the effect of student subsidies has been mixed indicating that the behavior may be impacted more by a higher level of awareness of the gross cost of attendance than by the available subsidy programs (Leslie & Brinkman, 1987). The receipt of incremental financial aid has a positive impact on enrollment decisions of applicants (Braunstein, et. al., 1999).

Another factor that may have affected the unexpected enrollment behavior observed in this study is increased State-

wide efforts to increase student enrollment. In the summer of 1999 the Texas Higher Education Coordinating Board (THECB) adopted a resolution to develop a State-wide enrollment plan that specifically identified critical goals, date for goal attainment, and the means by which to measure progress toward these goals (THECB - Higher Education Data, n.d.). The THECB approved the Closing the Gaps Higher Education Plan in October of 2000 (THECB - Higher Education Data, n.d.). The plan identified several State-wide goals for higher education and this included efforts to increase participation/enrollment by ensuring that students and their parents understood the importance of higher education and how to prepare for the academic and financial challenges. State-wide efforts to increase this awareness came in the form of the College Readiness Initiative (THECB - Higher Education Data, n.d.).

This and other awareness programs have re-enforced the importance of higher education and disseminated information and assistance to understand and navigate the complex federal and state financial aid programs. Researchers have found that increased parental involvement has a positive impact on enrollment decisions for all students (Perna & Titus, 2005). The aforementioned efforts may have increased parental involvement and simultaneously mitigated the negative effect that may result

due to lack of awareness of the importance of college and availability of financial aid programs.

Finally, the human capital theory is based on a variety of assumptions that can be summarized as follows - a rational consumer will choose to invest his/her finite resources in education versus other goods/services as long as the future benefits exceed the expected cost of education (Paulsen & Toutkoushian, 2008). Future benefits are assumed to be the increased wages that the individual student will earn in excess of peer students who do not earn a college degree. The current State-wide annual average cost of attendance for full-time enrollment continues to trail the national average for public four year institutions (THECB - College Cost, n.d.; College Board, 2009). This fact coupled with increased student and parental awareness and efforts of the College Readiness Initiative may indicate that student and parent consumers continue to view Texas public higher education as a good investment. Given these results, the researcher suggests that cost can continue to increase without any negative effect on enrollment. While this is inconsistent with the researcher's hypothesis, it may indicate that cost has yet to reach a point of equilibrium.



## **Recommendations for Future Research**

The following recommendations are made for further research.

1. It is recommended that the THECB expand existing State-wide databases to include additional data for students enrolled in public four year institutions. This additional data should include the number and individual amount of financial assistance awarded to include Texas Grants, Pell, SEOG, B-on-Time forgive-able loans, scholarships, etc... This will facilitate research on the effect of student subsidies on student enrollment.
2. It is recommended that the THECB develop a data search and extraction tool that allows researchers to access State-wide data collected. The THECB collects a tremendous amount of student information from State public two year and four year colleges and universities. However, much of the data is only available via preformatted reports that frequently do not include all elements of interest. A robust data extraction tool, similar to the IPEDS Pas would facilitate State-wide research on student participation, student success, and institutional effectiveness.
3. It is further recommended that the Texas State Data Center and Office of the State Demographer collect and publish college age actual and estimated populations.

This will facilitate the research of student enrollment trends within a context of eligible underlying populations.

4. Further research should be conducted at the institutional level to compare these State-wide findings to student enrollment in specific institutions. This lower level research, in collaboration with the institution, would allow for the inclusion of financial assistance data requested in Recommendation 1.
5. Further research should be conducted to determine the effect, if any, of the relatively new State funded financial assistance programs such as the Texas Grants.
6. Qualitative studies should be conducted to solicit in-depth information about the effect of college awareness efforts, to identify factors that influence student and parent value of higher education determination and to what extent gross cost and net cost affect student and parent enrollment decisions.

### **Implications for Educational Practice**

Increasing student participation in higher education will continue to be the focus of Federal and State policy. For example the recent American Recovery and Reinvestment Act included significant elements to encourage and increase student participation and success in education. The increases in

financial aid program (Pell and Work-study) funding and maximum award amounts coupled with the reconstitution of the Hope Credit into the American Opportunity Tax Credit - increasing the amount of the credit and making it partially refundable, are clear indications that the Federal government will continue to support programs to increase access, participation and success. The global competitiveness of this country's citizens is critical to domestic economic growth and development. Increasing student participation and converting this participation into degree completion is critical to these efforts.

At the state level, Texas policy makers have also recognized that higher education is the linchpin to increasing State productivity. The THECB continues to monitor and report on institutional progress in meeting participation goals and has recommended reward mechanisms that the Legislature has adopted to ensure continued institutional progress toward these goals. The State level conversations, regarding cost of higher education, have become highly politicized and policy decisions are frequently made on the basis of anecdotal information. The facts are that the average annual cost of tuition and fees continues to trail the national average. Student financial assistance programs, both Federal and State, continue to increase in both individual award amounts and the number of

students/populations who are eligible for assistance. In spite of significant increases in cost of attendance in Texas, enrollment of first-time full-time freshmen continues to grow.

This phenomenon of continued growth should be studied more closely and the results of this study and similar Texas based studies should be considered by the Legislature in the development of education policies. State policy that is informed by rhetoric and does not consider the systematic analysis of historical policy outcomes is doomed to retreat into the comfort of familiar solutions that do not necessarily achieve the desired outcomes. Continued efforts to understand student demand for higher education in Texas are needed to ensure that the State is indeed Closing the Gaps to Higher Education.

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## **Curriculum Vita**

Jose Carlos Hernandez was born and raised in El Paso, Texas. He graduated from Stephen F. Austin High School in 1984 and attended the University of Texas at El Paso (UTEP) where he graduated with a BBA in Accounting in July 1988. He obtained certification as a Certified Public Accountant in 1998 and completed his Master of Education at UTEP in May 2005.

He has been employed by UTEP since September 1988 when he was hired as a staff accountant. During that time he has served in various capacities including - Payroll Supervisor, Financial Analyst, Assistant Comptroller, Associate Comptroller, Comptroller Assistant Vice President and is currently Associate Vice President for Business Affairs /Comptroller. He serves on a variety of committees at the University, UT System, State, SACS, and has presented at state regional and national professional organization meetings. He is currently Chair of the Accounting Principles Committee of the Texas State Senior College and University Business Officers.

He is a graduate of the MALDEF Leadership Development Program, Western Association of Colleges and Universities Business Officers (WACUBO) Business Management Institute, UTEP Aware Leadership Development Program, Leadership El Paso, Class 23 of the Governor's executive Development Program and was

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