

# MIDWESTERN BUSINESS AND ECONOMIC REVIEW

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*Kirby R. Cundiff*



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## MIDWESTERN BUSINESS AND ECONOMIC REVIEW

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# ABSTRACTS

## **AN EVALUATION OF THE IMPACT OF THE FEDERAL RURAL EMPOWERMENT ZONE PROGRAM ON THE LOWER RIO GRANDE VALLEY OF TEXAS**

The purpose of this paper was to evaluate the impact of the Rural Empowerment Zone program on the Rio Grande Valley of Texas. To achieve this objective, a Human Development Index (HDI) was developed to analyze the impact of the program. Results of the analysis indicate that minimal development has taken place in these counties. The reason for the lackluster performance of the region is attributable to institutional factors which could not be captured by variables contained in the index.

## **IKE'S ECONOMIC IMPACT ON GALVESTON ISLAND COMPARED TO KATRINA'S ON NEW ORLEANS**

The hurricane recovery profile 10-12 months after Ike hit Galveston Island September 2008 is compared to the New Orleans Parish recovery profile 10-12 months after Katrina, August 2005. Employment and sales by industry data bring to light notable differences in the coastal city's recovery. Reasons for Galveston's more robust recovery point to differences in population trends, the degree of physical destruction, proportion of the low wage tourism export industry jobs and aggressive multi-jurisdiction post-storm public policy. Galveston's data interpretation was hindered by the effect of the US recession and non-related layoff in healthcare by the island's largest employer.

## **SOME DETERMINANTS OF LOCAL DISCRETIONARY SPENDING BY COLLEGE STUDENTS**

Using a high-quality stratified random sample of students from a Midwestern U.S. regional university, we examine the strength and direction of the impact of a number of potential determinants of student spending. Total discretionary spending is affected by students' frequency of bar visits, hours spent studying and working, parents' educational backgrounds, academic class, local place of residence, and the students' area of origin (rural/urban). Spending on recreation is affected by bar visits, hours spent studying, student stress levels, and the students' area of origin (rural/urban), with the impact of financial stress being much lower for females.

## **VIRTUAL ENTREPRENEURSHIP: AN EMERGING TOOL FOR SMALL BUSINESS INFORMATION AND DEVELOPMENT**

This study investigates the nature of entrepreneurial centers housed at colleges and universities and methods of assistance to small businesses and rural entrepreneurs. A description of three entrepreneurship centers and their services is presented. This study emphasizes the importance of entrepreneurial assistance to rural entrepreneurs and shows a variety of options these centers provide both locally and globally. A possible barrier to low participation in utilizing these outreach programs is difficulty in identifying the source of assistance on websites.

## **HUMAN FREEDOMS AND SOCIO-ECONOMIC DEVELOPMENT: A CROSS-NATIONAL STUDY**

Several studies have investigated the relationship between economic freedom and economic growth. This study contributes to the literature in two ways. First, three dimensions of individual freedom - economic, political, and religious - are examined. Second, the analysis focuses on how freedom impacts a broad measure of human well-being. Previous studies have typically measured economic progress using per capita GDP.

## **LIFE EXPECTANCY, HEALTH CARE, AND ECONOMICS**

In this paper I studied life expectancy, health care spending, medical resource availability, and lifestyle issues in the United States relative to other member countries in the Organization for Economic Cooperation and Development (OECD). I find the United States performs very poorly relative to its peers. While the United States spends more per capita by far than any other member country, it has a lower life expectancy and fewer medical resources than most member countries.

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# AN EVALUATION OF THE IMPACT OF THE FEDERAL RURAL EMPOWERMENT ZONE PROGRAM ON THE LOWER RIO GRANDE VALLEY OF TEXAS<sup>1,2</sup>

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## 1. INTRODUCTION

The Empowerment Zone and Enterprise Community (EZ/EC) program was established in 1993 by the passage of the Omnibus Budget Reconciliation Act by the U.S. Congress (GAO, 1997 and 1998). The objective of this ten-year program was to provide an impetus for growth and revitalization in urban and rural communities based on the principles of creating economic opportunities; sustainable community development; community-based partnerships; and strategic visions for change. EZ/EC designation was based on particular criteria, which pertained to characteristics such as geographic size, poverty level, and the preparation of a strategic plan for executing the above-mentioned principles.

Recipients of EZ and EC designations each received \$40 and \$3 million, respectively. In addition to these resources, which were funded through from Social Services Block Grants, businesses located or wishing to locate into these zones and communities were eligible to receive tax incentives.

As one of three rural regions that received rural empowerment zone designations<sup>3</sup> in December 1994, the Rio Grande Valley<sup>4</sup> of Texas sought to address a number of pressing development concerns indigenous to the area (RGVEZ, no date). Most notable of these concerns were the creation of sustainable jobs paying livable wages; educational opportunities that lead to high skills training; and, increased capacity in housing development.

The purpose of this study is to evaluate how the designation and implementation of the Empowerment Zone (EZ) program affected growth and development in the counties comprising the Rio Grande Valley EZ. To address this issue, a human development index was developed to look at changes in development in the region between the pre-EZ and EZ-implementation time periods.

The present literature on the impact of rural empowerment zones is not as prolific as that of urban empowerment zones and enterprise communities (Barrera, 2001). To the best of the authors' knowledge, the literature on this topic has been limited to reports from the GAO (1997, 1998, and 1999) and the occasional conference presentation (Barrera, 2001) and scholarly article (Wang and Van Loo, 1998). This paper hopes to provide additional insight into the EZ program's efficacy and stimulate discussion on the subject at hand.

## 2. DATA AND METHODS

At present, methods for measuring the EZ/EC program's impact have focused on measures such as the number of jobs created, the number of training programs established and the number of housing units built or rehabilitated.<sup>5</sup> Such measures do not necessarily provide an encompassing view of development as envisioned in the program principles. In order to capture the core principles of the program, this paper proposes the use of a human development index (HDI).

The United Nations Development Programme introduced the HDI, which has served as a composite measure of human development, in 1990 with the publication of the first Human Development Report (UNDP, 2001). At the heart of these human development reports was the promotion of an alternative means of viewing human development. These reports have called for a shift in the development paradigm from a focus on economic growth towards a more evenhanded interest in equity, sustainability, productivity, and empowerment.

In its original form, the HDI measures a nation's overall achievement based on three basic dimensions. The first dimension, which is *longevity*, is measured based on life expectancy. The second dimension, which is *knowledge*, is measured based on a set of variables pertaining to educational attainment. The final dimension, which is *decent standard of living*, is measured using adjusted income per capita in purchasing power parity U.S. dollars. Indexes are developed for each of these dimensions. The average of these dimension indexes forms the HDI. The resulting HDI provides a value between zero and one. Nations with HDI values closer to one (zero) represent higher (lower) levels of development. An explanation of human development index construction and its use in this study are presented in the next section.

While the initial applications of the HDI have been used to compare achievements in human development among nations, a number of studies have been conducted using the HDI to compare achievements at the sub-national level (Agostini and Richardson, 1997; Felder, 2002; and, Hanham, Berhanu, and Loveridge, 2002) and among population groups (Corrie, 1994). This study uses the HDI in a manner similar to the works conducted at the sub-national level.

The components<sup>6</sup> of the HDI used in this study focused on three of the goals of the RGVEZ strategic plan. One of these goals, which was the creation of education opportunities that lead to high skills training, was represented by a set of variables

that characterize the *education* component of the strategic plan. Another component, which was *economic opportunity*, pertained to the goal of generating sustainable jobs paying livable wages. The third component, which was referred to as *access to housing*, corresponded to the third strategic plan goal of increased capacity in housing development. The variables that comprised these components are presented in Table 1.

In order to analyze how counties in the RGVEZ have progressed since EZ designation, two HDIs were developed. The first HDI focused on the above-mentioned components using data from 1990 (pre-EZ designation time period). The second HDI utilized data for 2000 (EZ implementation time period). Progress was measured by comparing human development indexes for both time periods. An increase (decrease) in HDI values over the time periods indicates increasing (decreasing) development. In addition, each of these counties were ranked vis-à-vis other counties in Texas based on their HDIs to provide an added perspective with respect to the level of growth (decline) in development that has transpired.

### 3. TEXAS HUMAN DEVELOPMENT INDEX

This section provides an exposition of how the human development index, as utilized in this study, was constructed. The creation of this index was based on the original index as developed by the United Nations Development Programme (2001).

The data that was utilized for this study were obtained from the Texas State Data Center (TXSDC) and the Texas Workforce Commission (TXWC). The indexes that were developed for this paper's version of the Human Development Index take on the following general form:

$$\text{Index} = (X_i - \min X) / (\max X - \min X)$$

Where  $X_i$  – County I's value for a specific variable;

Min X – the lowest observed value among all counties for the specific variable; and,

Max X – the highest observed value among all Counties for the specific variable.

The county-level variables used to develop the components of the Human Development Index were as follows:

Education Variables (Data Source: TXSDC)

- (1)  $X^{E1}$  - Percent of persons 25 years of age or older who are high school graduates or higher (1990 and 2000)

$$X^{E1} \text{ Index} = (X_i^{E1} - \min X^{E1}) / (\max X^{E1} - \min X^{E1})$$

- (2)  $X^{E2}$  - Percent of persons 25 years of age or older who are college graduates or higher (1990 and 2000)

$$X^{E2} \text{ Index} = (X_i^{E2} - \min X^{E2}) / (\max X^{E2} - \min X^{E2})$$

- (3)  $X^{E3}$  - Percent of total population that are enrolled in elementary and high school (1990 and 2000)

$$X^{E3} \text{ Index} = (X_i^{E3} - \min X^{E3}) / (\max X^{E3} - \min X^{E3})$$

Employment Variables (Data Sources: TXSDC and TXWC)

- (1)  $Y^{E1}$  – Median Household Income (1989 and 1999) - TXSDC

$$Y^{E1} \text{ Index} = (Y_i^{E1} - \min Y^{E1}) / (\max Y^{E1} - \min Y^{E1})$$

- (2)  $Y^{E2}$  - Percent of families living below the poverty level (1989 and 1999) - TXSDC

$$Y^{E2} \text{ Index} = 1 - [(Y_i^{E2} - \min Y^{E2}) / (\max Y^{E2} - \min Y^{E2})]$$

- (3)  $Y^{E3}$  – Average Monthly Unemployment Rate (1990 and 2000) - TXWC

$$Y^{E3} \text{ Index} = 1 - [(Y_i^{E3} - \min Y^{E3}) / (\max Y^{E3} - \min Y^{E3})]$$

Housing Variables (Data Source: TXSDC)

- (1)  $Z^{H1}$  – Total Number of Housing Units (1990 and 2000).

$$Z^{H1} \text{ Index} = (Z_i^{H1} - \min Z^{H1}) / (\max Z^{H1} - \min Z^{H1})$$

- (2)  $Z^{H2}$  – Number of Owner-Occupied Housing Units (1990 and 2000).

$$Z^{H2} \text{ Index} = (Z_i^{H2} - \min Z^{H2}) / (\max Z^{H2} - \min Z^{H2})$$

- (3)  $Z^{H3}$  – Median Value of Owner-Occupied Housing Units (1990 and 2000).

$$Z^{H3} \text{ Index} = (Z_i^{H3} - \min Z^{H3}) / (\max Z^{H3} - \min Z^{H3})$$

#### Indexes

- (1) Education Index =  $(X^{E1} + X^{E2} + X^{E3}) / 3$

- (2) Employment Index =  $(Y^{E1} + Y^{E2} + Y^{E3}) / 3$

- (3) Housing Index =  $(Z^{H1} + Z^{H2} + Z^{H3}) / 3$

- (4) Human Development Index =

$$(\text{Education Index} + \text{Employment Index} + \text{Housing Index}) / 3$$

## 4. RESULTS

Results of the construction of the human development indexes for Cameron, Hidalgo, Starr, and Willacy Counties are presented in Table 2. Based on the table, the four counties have posted gains albeit minimal in index values for most of the component and human development indexes. The *economic opportunity* index was the only component that reflected declining values from 1990 to 2000.



What is surprising to note is that despite the increased index values the relative ranks of these counties vis-à-vis other counties in Texas have not increased. Except for increased rankings in the *access to housing* component index, all other indexes, including the HDI, have resulted in no change or decreases in county rankings. An analysis of these findings is presented below.

#### 4.1 EDUCATION

Education component indexes for the four RGVEZ counties have shown positive increases from the 1990 index to the 2000 index. Cameron County demonstrated the largest increase from 0.3947 in 1990 to 0.4597 in 2000. This county also posted the highest index values of the four RGVEZ counties. On the other hand, Starr County showed the lowest education component indexes among the four counties for both time periods.

In terms of how these RGVEZ counties ranked with respect to other Texas counties, Cameron County was the only county that ranked in the upper half of all Texas counties in the pre-EZ designation period. Of the remaining counties, Starr County ranked in the bottom 10 percent of Texas counties. These counties' ranking deteriorated in the EZ-implementation time period. All four counties ranked in the bottom half of all Texas counties with Willacy joining Starr in the bottom 10 percent. Why have county rankings decreased despite improvements in index values?

A possible explanation is the values of the variables that represent the education component. A perusal of education variables from Table 1 shows that these counties have lower percentages of

high school and college graduates when compared to the state. In terms of the percentage of high school graduates, RGVEZ counties on average had approximately 29 percent and 28 percent fewer high graduates than the state average in 1990 and 2000, respectively. As for college graduates, these counties had roughly 10 percent and 13 percent less graduates than the state average for the same time periods. It is only the percentage of the population enrolled in elementary and high school where the RGVEZ counties have exhibited higher percentage rates than the state. This is primarily due to the younger population base on these counties.

#### 4.2 ECONOMIC OPPORTUNITY

County index values for this component have exhibited little change between the pre-EZ designation and EZ-implementation periods. All of the counties, except for Starr, posted decreases in index values. In terms of rank with respect to other Texas counties, the four RGVEZ counties have been positioned at the bottom of the county rankings in both time periods.

Table 1 may be able to shed some light on the dismal performance of these counties in the economic opportunity index rankings. In terms of the percentage of families living below the poverty level, the RGVEZ counties have exhibited average values that are twice the state average in both time periods. As for the average monthly unemployment rate, these counties have displayed average rates that are three times higher than the state rate in 1990 and 2000. On the other hand, median household incomes in these counties in 1990 and 2000 have consistently been half of the state's median value.

**TABLE 1: Selected Characteristics of Counties in the Rio Grande Valley Empowerment Zone.**

Variables	County								Texas	
	Cameron		Hidalgo		Starr		Willacy		1990	2000
	1990	2000	1990	2000	1990	2000	1990	2000		
<b>Education</b>										
1	50.0%	55.2%	46.6%	50.5	31.6%	34.7%	42.9%	48.7%	72.1%	75.7%
2	12.0%	13.4%	11.5%	12.9%	6.7%	6.9%	8.8%	7.5%	20.3%	23.2%
3	26.8%	23.3%	27.7%	23.7%	30.7%	25.0%	28.1%	23.0%	19.4%	19.1%
<b>Economic Opportunity</b>										
4	\$17,336	\$26,155	\$16,703	\$24,863	\$10,182	\$16,504	\$14,590	\$22,114	\$27,016	\$39,927
5	33.7%	28.2%	36.3%	31.3%	56.5%	47.4%	37.6%	29.2%	14.1%	12.0%
6	12.7%	8.7%	22.4%	13.6%	40.5%	22.5%	16.7%	15.7%	6.3%	4.2%
<b>Access to Housing</b>										
7	88,759	119,654	128,241	192,658	12,209	17,589	6,072	6,727	7,008,999	8,157,575
8	47,172	65,875	72,715	114,580	8,137	11,450	3,813	4,316	3,695,115	4,716,959
9	\$38,100	\$53,000	\$35,600	\$52,400	\$21,700	\$37,800	\$25,000	\$34,600	\$58,900	\$82,500
<b>Other</b>										
10	261,728	336,991	387,200	573,920	40,805	53,840	17,699	20,080	17,056,755	20,946,503

SOURCES: Texas State Data Center  
Texas Workforce Commission

NOTES: The variables' definitions are as follows:  
 (1) Percent of persons aged 25 years and older who are high school graduates;  
 (2) Percent of persons aged 25 years and older who are college graduates;  
 (3) Percent of total population that are enrolled in elementary and high school;  
 (4) Median household income (data for 1989 and 1999);  
 (5) Percent of families living below the poverty level (data for 1989 and 1999);  
 (6) Average monthly unemployment rate;  
 (7) Total number of housing units;  
 (8) Number of owner-occupied housing units;  
 (9) Median value of owner-occupied housing units; and,  
 (10) Population.

Why has there been no change in the economic opportunity values for RGVEZ counties between 1990 and 2000? According to Barrera (2001), the economic development and job training programs implemented under the empowerment zone's strategic plan were flawed. The programs that were established did not generate sustainable jobs paying livable wages. Most of the jobs created were of a minimum wage, seasonal, and lay-off prone nature.

### 4.3 ACCESS TO HOUSING

Of the three components of the human development index used in this study, the *access to housing* component showed the most promise for the four South Texas counties. All the counties posted increases in index values and county rankings between 1990 and 2000. Hidalgo and Starr Counties made significant gains in rank. Hidalgo, which was classified as an urban county together with Cameron, moved from 47<sup>th</sup> to 25<sup>th</sup> among Texas counties in terms of housing access. Starr, which was categorized as a rural county together with Willacy, jumped from 240<sup>th</sup> to 192<sup>nd</sup> from 1990 to 2000. Why have these counties performed well?

Based on Table 1, the four RGVEZ counties displayed high growth rates in terms of the total number of housing and owner-occupied housing units between 1990 and 2000. On average, the growth in the total number of housing units in these counties was roughly 19 percent higher than the state. These counties outpaced the state in the growth rate of owner-occupied housing units by an average of 10 percent.

The rapid growth in the number of owner-occupied housing units could be attributed to several factors. One is the fact that the values of these units have been lower than the state's median value. In 1990 and 2000, the median values of owner-occupied housing units in these counties were approximately \$28,800 and \$38,050 less than the state median value. The lower median value of these owner-occupied housing units has made home ownership accessible to most local residents.

Another factor has been efforts by local, state, and federal organizations to improve housing conditions in depressed quarters in these counties (Dabir, 2001). Programs such as the individual development account<sup>7</sup> could present welcome relief from traditional means of financing home purchases and construction.

### 4.4 HUMAN DEVELOPMENT INDEX

As noted in the previous section, the human development index that was developed in this study represented the average value of the three component indexes discussed above. Based on Table 2, the HDIs for the four RGVEZ counties ranged from 0.1072 for Starr to 0.3224 for Cameron in 1990. These counties' experienced positive increases HDI values in 2000 ranging from 0.1537 for Starr to 0.3540 for Cameron. These increases in HDI values over the time period under study provided an indication of modest gains in development for the four counties based on the three components that were utilized.

It is interesting to note that there has been little change in these counties' HDI ranks, except for Cameron County, between

**TABLE 2: Component and Human Development Indexes for Counties in the Rio Grande Valley Empowerment Zone.**

County	Education Index					
	1990		2000		Change	
	Index Value	Rank	Index Value	Rank	Index Value	Rank
Cameron	0.3947	111	0.4597	153	0.065	-42
Hidalgo	0.3814	128	0.4381	181	0.057	-53
Starr	0.2888	238	0.3275	248	0.039	-10
Willacy	0.3395	180	0.3682	238	0.029	-58
County	Economic Opportunity Index					
	1990		2000		Change	
	Index Value	Rank	Index Value	Rank	Index Value	Rank
Cameron	0.4345	244	0.4251	244	-0.009	0
Hidalgo	0.3318	250	0.3284	249	-0.003	1
Starr	0.0000	254	0.0423	254	0.042	0
Willacy	0.3523	248	0.2977	250	-0.055	-2
County	Access to Housing Index					
	1990		2000		Change	
	Index Value	Rank	Index Value	Rank	Index Value	Rank
Cameron	0.1381	62	0.1772	53	0.039	9
Hidalgo	0.1555	47	0.2190	25	0.064	22
Starr	0.0328	240	0.0912	192	0.058	48
Willacy	0.0406	232	0.0780	213	0.037	19
County	Human Development Index					
	1990		2000		Change	
	Index Value	Rank	Index Value	Rank	Index Value	Rank
Cameron	0.3224	206	0.3540	218	0.032	-12
Hidalgo	0.2896	235	0.3285	235	0.039	0
Starr	0.1072	254	0.1537	254	0.047	0
Willacy	0.2442	249	0.2480	251	0.004	-2

NOTE: The lowest possible rank is 254 due to the fact that there are 254 counties in Texas.



1990 and 2000. This means that these counties ranked in the bottom 20 percent of Texas counties in terms of development prior to and during the EZ program implementation. Does this mean that the EZ program has had little or no impact on the counties' development?

## 5. DISCUSSION AND LIMITATIONS

While there has been no change in the HDI rankings for the four RGVEZ counties between 1990 and 2000, this does not necessarily provide an indication that EZ program has been ineffective. Several factors need to be brought into focus.

Based on the data used in developing the component and human development indexes, it was evident that the values of the counties' education and economic variables were significantly lower than the state's average values. Despite significant improvements made by the counties in terms of graduation rates, median household incomes, percentage of families living below poverty levels, and unemployment rates, it was difficult to catch up with growth that was taking place in other parts of the state.

Other factors contributed to the lackluster HDI performance of the RGVEZ counties. These factors were the flawed development of the RGVEZ strategic plan; local stakeholder inexperience in program development and implementation; and, lack of clarity and guidance on the part of federal agencies that oversaw the program.

In terms of flawed strategic plan development, Barrera (2001) noted that in the conception of the strategic plan there was a fundamental deficiency of understanding with respect to what a strategic plan is about and how the process should be undertaken. She mentioned that in the grant application, consultants were hired to organize efforts, collect information, and produce the strategic plan document. Barrera observed that if the applicants' intent was to produce a strategic plan, the consultants' role should have focused on training and facilitation in strategic plan development. Furthermore, she stated that the final document (strategic plan) was essentially an action plan that described the area's dire conditions and a wish list of what the organization would do with the funds if they successfully received the grant.

The blame for this misguided view of strategic plan development cannot be placed solely on the shoulders of the entity that initiated the empowerment zone application. It can be attributed to two additional factors: a lack of experience on the part of the organization managing the empowerment zone program and a lack of clarity and guidance on the part of federal agencies that oversaw the program.

In a GAO report to a U.S. House of Representatives subcommittee (GAO, 1998), it was stated that the management organization's prior experience in developing and implementing programs similar to the EZ program contributed to the success in strategic plan development and program implementation. The report noted that in the case of the Kentucky Highlands EZ, one of the three recipients of the first rural EZ designation together with the Rio Grande Valley, the organization that has

been managing the EZ program has been in existence for more than two decades and has had prior experience in implementing economic development programs funded by federal entities such as the U.S. Department of Commerce's Economic Development Administration. On the other end of the spectrum, the Rio Grande Valley Empowerment Zone Corporation, which is a 501c3 private non-profit entity that has been managing the Texas rural EZ, was formed after the region received EZ designation (RGVEZ, no date).

A prior GAO report (1997) to the U.S. Senate Committee on Agriculture, Nutrition, and Forestry, noted that lackluster performance of the EZ program stemmed from the lack of clarity and guidance on the part of federal agencies that oversaw the program. One problem encountered was the short time frame in which EZ/EC applications were to be made.<sup>8</sup> Another problem involved federal oversight and implementation of the EZ/EC program.

The USDA, which was given the task of overseeing the implementation of the rural EZ/EC program made initial misstatements with respect to the disbursement of EZ/EC funds. At several meetings, USDA Office of Community Development officials stated that funds were to be released as a lump-sum payment. At other meetings, statements were made that pertained to incremental disbursement of program funds. USDA oversight of the program was plagued lack of systematic reporting by USDA state coordinators and EZ/EC program participants. This reporting inadequacy stemmed from inadequate funding for hiring and training staff that would oversee the wide range of economic and social development projects involved in the EZ/EC program.<sup>9</sup>

While explanations for the less-than-desirable HDI performance of the Rio Grande Valley Empowerment Zone have been given, this study has been limited by several factors. One limiting factor is the geographic scope of the study. Federal guidelines for EZ/EC applications use the census tract as the geographic basis for zone designation. The current study has been limited to using counties as the geographic reference of analysis due to the availability of social and economic data.

Another limiting factor is the choice of variables used in measuring the components of the human development index used in this study. The variables used in this study were chosen based on the availability of information at the county-level for the two time periods being investigated.

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## ENDNOTES

1. The views expressed in this report are solely those of the authors and not of the institutions they represent.
2. This paper is a revision of a presentation that was made at the Southern Agricultural Economics Association annual meeting in Tulsa, OK (2004).
3. The Kentucky Highlands and the Mississippi Delta were the two other regions that received rural empowerment zone designations.
4. The Rio Grande Valley is composed of the following counties: Cameron, Hidalgo, Starr, and Willacy.
5. Information on these measures was obtained from reports from the individual designees on the EZ/EC website (USDA, 2002).
6. These were measured using available variables that reasonably represent these components.
7. An individual development account or IDA is similar in structure to an individual retirement account (IRA). An IDA allows a participant to save money in an account which can be used for the purchase of a first home, pay for higher education expenses, or provide capital for a small business. Local community organizations exercise management control over these IDAs while the funds are in the safekeeping of local financial institutions.
8. After President Clinton announced the creation of the program, communities were given five and a half months to submit their program applications.
9. A majority of the USDA state coordinators, who were involved in the program, were selected from existing staff at USDA state offices. They did not possess the necessary experience and training that would allow them to effectively oversee the EZ or EC programs in their respective states. A subsequent GAO report (1998) noted that most of these deficiencies have been rectified.

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# **IKE'S ECONOMIC IMPACT ON GALVESTON ISLAND COMPARED TO KATRINA'S ON NEW ORLEANS**

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## **INTRODUCTION**

Natural disasters materially interrupt the vitality of any economy they strike. Cities bordering the Gulf of Mexico periodically suffer the onslaught of Atlantic hurricanes. In the hurricane's aftermath, local and regional leaders and elected officials must manage recovery efforts and guide their community's return to normalcy. This paper discusses the impact of Hurricane Ike on the people, assets and economic production of Galveston Island, compares the impact profile to New Orleans Parish after Hurricane Katrina, then highlights relevant differences and similarities. The authors suggest that Galveston Island's comparatively robust recovery can be explained by demographics, export industry distinctions, post-storm public response and the extent of physical damage.

National Oceanic and Atmospheric Administration (NOAA) records show that the 2008 Atlantic hurricane season produced 16 named storms: of which eight were hurricanes; of these, five were at Category 3 or higher. Modern storm tracking capabilities permit individual evacuation plans and coordinated public response efforts in advance of a hurricane threat.

The analysis period for Galveston Island, using monthly and quarterly data, runs from 2007 to 2009 and focuses on the 10-month period after Ike's north Galveston Island landfall at approximately 2 am September 13, 2008. Ike was a category 2 storm with 100-110 mph winds accompanied by a 14 foot storm surge typical of a category 4 storm. The analysis period for New Orleans Parish uses available quarterly data, and covers the 10-12 month post-storm recovery period beginning August 2005. Katrina made landfall in New Orleans Parish August 20, 2005. A strong category 2 storm with 175 mph wind, the storm surge breached the levy system and inundated 80 percent of the city.

Two events, one external and one internal to Galveston Island, confound the assessment using available local data. First, external to the island, the onset of the US recession in December 2007 affects the interpretation of Galveston's employment and unemployment data. About half the island's labor force lives on the Texas mainland and many workers make a daily drive onto the island. Second, internal to the island the University of Texas Medical Branch-Galveston (UTMB), the largest single employer, announced the layoff of 2,400 from its more than 12,500 employees on November 18, 2008. Though Ike prompted this long-expected layoff announcement and UTMB suffered serious hurricane damage, its motivation for the layoffs cannot completely be ascribed to the storm when interpreting Local Area Unemployment Statistics (LAUS).

LAUS employment data methods integrate state unemployment claims by place of work with census-based journey to work data to derive employment estimates for select cities over 25,000 in population. LAUS data also do not disaggregate employment data by industry or occupation. The next section discusses salient Ike-related impact data followed by a section addressing the impact of Hurricane Katrina on New Orleans Parish. Discussion of reasons for differences between the two cities' recovery response, despite notable demographic and economic similarities, completes the discussion.

## **IKE'S ECONOMIC IMPACT ON GALVESTON**

Galveston Island is the Houston region's closest and most desirable access to beaches and sport fishing, yet from 2000-2008, the City of Galveston's population decreased 8 percent, from 59,070 to 57,247. In stark contrast, from 2000 to 2008 the Houston-Sugarland-Baytown MSA population, which encompasses Galveston Island, grew 21 percent, from 4.7 million to 5.7 million population. The island's population decline was not the result of any industry's demise, but more the off-putting effect of limited and costly housing availability, especially for workers in relatively low-wage cyclical tourism industry occupations.

One year after Hurricane Katrina hit New Orleans Galveston Island officials implemented a comprehensive post-storm policy to rehabilitate tourism, the island's largest export industry, in the event of a hurricane. Organized through the Galveston Economic Development Partnership (GEDP), the post-storm response plan stressed early preparation and local recovery coordination with Galveston County, the State of Texas and federal agencies. City leaders had self-funded recovery support for local business re-development programs with codified eligibility criteria for damaged local businesses and homeowners. Wide-ranging and coordinated programs like the Galveston Business Recovery Fund (local), Community Development Block Grant Grants (regional), Economic Development Administration programs (regional), Small Business Administration programs (regional) and the Governor's Office of Economic Development and Tourism (state) formed a diversified structure through which organizers could quickly and directly respond to qualified post-storm recovery needs. Relationships with local banks also could facilitate a range of regional, state and federal business loan programs.

In Ike's advance, following a state-defined zone-by-zone evacuation protocol, authorities guided about sixty percent,

about 34,000, of the island's residents to the Texas mainland. Ike's slow moving girth, and sustained 100+ mph winds, took 8 hours to cross the island. Even before nightfall on September 13<sup>th</sup>, long standing landmarks on Seawall Boulevard, like the infamous Balinese Room and the 61<sup>st</sup> Street pier, were swept away. Yet the 17 foot high, 10-mile long seawall built after the 1900 storm, held against Ike's 14 foot storm surge. Early reconnaissance counted 17 buildings destroyed, mostly in downtown Galveston, where nearly eight vertical feet of water had inundated the east end's historic Strand district. The GEDP immediately launched its pre-established recovery policies in a marathon effort to coordinate and triage legitimate claims for island businesses and homeowners. One year later, the island's population is unofficially pegged at 46,000, down 20 percent from its pre-Ike 2008 census estimate of 57,086.

The publicly-funded UTMB-Galveston campus and associated John Sealy hospital suffered an estimated \$710 million in damage. That UTMB, the cornerstone of the island's second major export industry--healthcare, carried only \$100 million in catastrophic loss insurance initially prompted the University of Texas (UT) board of regents to suggest the 110-year old medical school be closed and its hospital moved to the mainland. Ten months later UT regents reversed themselves and the Texas Legislature voted to restore the institution's facilities. Similarly, the privately-operated Shriners Burn Institute was so badly damaged their board initially voted to abandon the facility, but later reversed its decision. The island's relatively strong post-storm recovery likely influenced these decisions.

The Port of Galveston, the third export industry sustaining the island's economy, had relocated larger ships to safe harbor further north in the Bayport Container Terminal. Rising water and wind damage to Port of Galveston ground-level assets, especially Terminal 1 where cruise ships berth, required immediate repairs of about \$55 million.

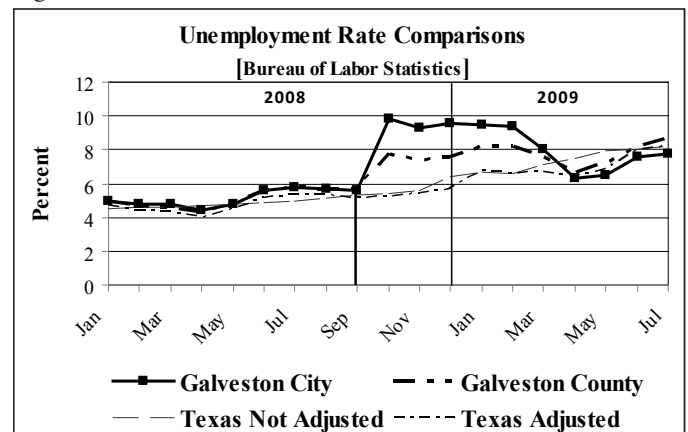
Days after the storm passed, aerial photo surveys allowed the Galveston County Appraisal District to assay damaged parcels across the city's 6 development districts. The city's Long Term Recovery Committee pored over those results and found total taxable value would diminish by an average of 2 percent across 4.7 percent of the island's 28,093 parcels. The estimated ad valorem tax revenue loss to the city's \$45.1 million 2007-2008 operating budget would be about \$0.5 million. Ad valorem tax collections, the city's largest revenue source, account for 41.5 percent of city operating revenues.

LAUS employment data tell a multi-layered story of the event. Figure 1 below shows unemployment rates for the City of Galveston, Galveston County and the State of Texas. The slowly rising unemployment rate between April and September 2008 reflects the national recession's effect. The 2008 September to November unemployment rate spike reflects those in the island's labor force who lost jobs during that period plus transient non-island construction workers seeking to aid the recovery. A similar unemployment rate spike occurred for the whole of Galveston County. After the September 2008 peak, the unemployment rate for both the city and county began to fall, though they remained above the rate for Texas until April

2009, after which time all unemployment rates generally rose together; as the US recession took a deeper hold on the regional economy.

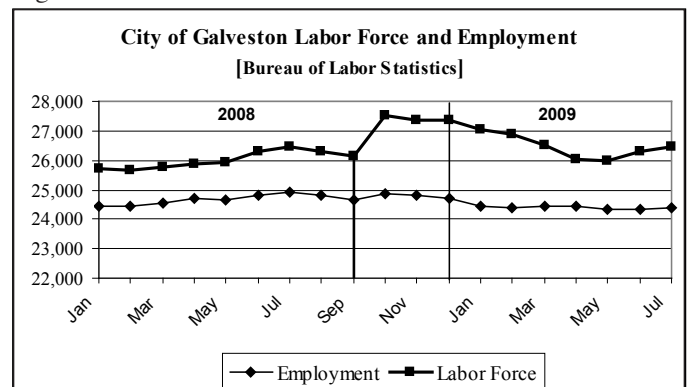
UTMB's November 18<sup>th</sup> 2,400 jobs layoff announcement slowly added to area unemployment, but that effect that cannot be ascribed solely to the storm for two reasons. First, the UTMB budget comes primarily from state general revenue funds not immediately affected by the storm or the national recession. Second, because of its geographically dispersed medical delivery system, the separated UTMB employees may have held positions almost anywhere in southeast Texas. By July 2009, the official City of Galveston unemployment rate of 7.8 percent was two percentage points above July 2008's 5.8 percent, suggesting the storm's immediate effect on labor displacement abated but the recession's effect deepened.

Figure 1



The City of Galveston labor force October 2008 spike in Figure 2 confirms that the September 2008 spike in unemployment for the City of Galveston came largely from transient additions to the island's labor force. UTMB's layoff announcement did not occur until November 18, 2008, after which the employed worker count begins to fall. By 2009 both the unemployment count and unemployment rate remain above pre-Ike levels. By July 2009 the total employment count of 24,410 was 98 percent of the July 2008 employment count of 24,929, a clear sign of the island's post-Ike recovery.

Figure 2





Ike interrupted all island industry segments, especially the three largest export industries: tourism, healthcare, and shipping. Independent studies estimate that island tourism, Galveston's main export-driven industry, has an \$800 million annual impact, and healthcare, the second largest export industry, has a \$250 million annual impact on the island. Together these two industries account for 60 percent of the island's nearly \$2 billion in annual economic activity, as reported by the State Comptroller's Office. Neither of these industries has an official definition for activity or employment reporting purposes at the local level, hindering a precise interpretation of related employment and sales data.

Galveston is homeport to Carnival Cruise Lines and hosts Royal Caribbean cruise ships, key components of the island's tourism and leisure industry. The Galveston port ranks sixth in the nation for cruise traffic and handles over 600,000 cruise passengers annually. The port also conducts a significant shipping operation, handling a diverse mix of roll-on/roll-off cargo, dry bulk, export grain, refrigerated fruit and general cargo. Though port terminal facilities suffered serious rising water damage, seven weeks after Ike, the port's Terminal 1 was again operating. By December 2008, the port was operating at full capacity and exceeded its projected monthly revenues for December 2008 by \$300,000. Annual 2008 revenues of \$20.8 million were just \$0.5 million short of 2007's record revenues. Port activity also lacks an official industry definition for the state Comptroller's Office and Texas Employment Commission data reporting.

Data in Table 1 below summarize quarterly percentage changes from the prior year for all Galveston industries, then separately for the construction and retail industries. Ike struck the island in the last month of the third quarter 2008. The second and third quarters of each year bracket the island's prime tourist season. Retail sales, for all of 2008 were \$533 million and construction sales totaled \$126 million. Adding these two figures to the estimated totals for island tourism (\$800 million), healthcare (\$250 million) and port activity, comprises the bulk of the island's business activity.

Year-over-year sales for "All Industries" fell during the fourth quarter 2008, in response to Ike, and continued declining in the first two quarters of 2009. Construction activity had declined relative to 2007 through the third quarter of 2008, but then

Table 1

Year-Over-Year Percent Change in Quarterly Taxable Sales for Select Galveston Industries				
Year	Qtr	All Industries	Construction	Retail
2008	1	3.0	-23.3	-1.5
2008	2	8.1	-20.1	3.7
2008	3	-6.1	-36.7	-9.4
2008	4	-14.9	61.9	-12.2
<b>2008 Annual</b>		<b>-2.8</b>	<b>3.4</b>	<b>-5.0</b>
2009	1	-11.9	34.6	0.4
2009	2	-20.6	47.1	-3.6

Source: State of Texas Comptroller's Office

expanded dramatically, in response to the island's recovery. Ike prompted a significant retail sales decline in the last two quarters of 2008 compared to 2007. Retail sales stabilized in the fourth quarter, 2006, then continued a modest decline in the second quarter of 2009, likely due more to the national recession than the storm.

Data reported in Table 2 below show monthly sales tax revenues flowing to the city from all taxable sales activity plus the year-to-year change for 2007 through 2009. Sales tax revenues account for 30 percent of city operating income, about \$45.1 million for 2007-2008. Construction related activity after September 2008 replaced much of the post-storm sales tax gaps of other sectors.

Table 2

City of Galveston Monthly Sales Tax Allocation (Millions)					
Month	2009	Change	2008	Change	2007
Jan	\$1.49	\$0.13	\$1.36	\$0.17	\$1.19
Feb	1.80	0.13	1.66	0.25	1.41
Mar	1.37	0.18	1.19	0.06	1.13
Apr	1.36	0.12	1.24	0.06	1.17
May	1.72	0.13	1.60	-0.09	1.69
Jun	1.42	0.12	1.30	0.11	1.20
Jul	1.34	-0.02	1.36	0.00	1.37
Aug	1.99	0.12	1.87	0.05	1.82
Sep	1.60	-0.19	1.79	0.20	1.59
Oct	1.41	0.41	1.00	-0.51	1.52
Nov	1.59	0.38	1.21	-0.44	1.65
Dec	1.07*	-0.30	1.37	0.18	1.19
<b>Total</b>	<b>\$18.17</b>	<b>\$1.21</b>	<b>\$16.97</b>	<b>\$0.04</b>	<b>\$16.93</b>

Source: State of Texas Comptroller's Office  
\*December 2009 reporting is incomplete.

Although total annual sales tax revenue rose for 2009, the city's recovery expenses still far exceeded its storm contingency fund balance.

In sum, Galveston Island's Ike-related damage, while severe, was not catastrophic on the whole. By their design, post-storm recovery efforts led by local leaders were swift, comprehensive and coordinated. While the hurricane's effect on the local labor force was relatively large, despite the US recession, recovery began after about 10 months, with July 2009 employment just 266 jobs below the September 2008 pre-Ike employment of 24,676. Furthermore, 2009 sales revenue to the City of Galveston of \$18.17 million significantly exceeded the \$16.96 million generated in 2008.

Even though about 11,000 former residents have not permanently returned to the island as of July 2009 and complete property damage repair may take several years, the island's 12-month response to Hurricane Ike appears remarkable. Validating the effectiveness of GEDP's recovery efforts, the Texas Economic Development Council (TEDC) awarded the city top honors as Community of the Year, 2009. Always working to diversify its economic base, GEDP leaders now look toward bolstering its bio-technology and commercialization program in concert with UTMB's Level 4 Bio-Hazard facility and pursuing new strategic development initiatives with the Falstaff Brewery and Jean Lafitte building.

## NEW ORLEANS PARISH AND KATRINA IN CONTRAST

Hurricane Katrina made landfall in New Orleans Parish August 20, 2005, a strong category 2 with 175 mph winds whose storm surge inundated 80 percent of the city after breaching the city's levy system. New Orleans Parish' 10 to 12 month post-storm recovery profile review begins August 2005, and uses available quarterly data. New Orleans Parish' export industries are tourism, shipping and educational services, it is home to seven universities. The New Orleans Parish population had been in steady decline for fifteen years prior to Katrina's landfall. Its 1990 population of 496,938 diminished to 484,674 by 2000 and 451,000 in 2003; then fell dramatically to a post-storm 2006-2008 population of 270,245. While the city had some high wage job sectors, like oil and gas, its average wage relative to the US was falling due to a high proportion of jobs in the lowest paying sectors: accommodation, food services and retail trade. Against that economic backdrop, Katrina delivered its blow to New Orleans Parish.

Data in Table 3 below capture the impact of Katrina using select quarterly employment data (the Bureau of Labor Statistics was unable to properly collect monthly LAUS data for 10 months after the hurricane). The first three listed industry sectors, port, tourism and educational services, form the export industries for New Orleans Parish and account for 26 percent of all industry employment. The sum of the seven listed industry segments account for fifty-two percent of the parish's total labor force. Industry downtrends between 2000 and 2004 reflect the parish's pre-storm weakness in port activity, retail and construction.

Katrina's landfall in the middle of the third quarter of 2005 dramatically diminished employment in every reported sector for the fourth quarter of 2005. Data for the third quarter 2005 were not collectible. Compared to second quarter 2004 employment, fourth quarter 2005 employment for the three export sectors fell 46 percent, with tourism falling 58 percent in the face of total employment falling 42 percent. By the second quarter 2006 only educational services, construction and professional services showed solid employment gains. Second quarter 2006 total employment for New Orleans Parish remained 40 percent below pre-Katrina levels.

The New Orleans Parish post-storm recovery profile is starkly different from that of Galveston Island. Prior population and

employment decline, a low wage base industry and storm recovery policies that proved inadequate given the level of destruction, drove the local economy to unprecedented lows. Key export sector declines combined with widespread physical destruction east of the French Quarter dislodged businesses from their clientele, diminishing the future economic outlook. Katrina's impact so devastated a parish already in decline that the combination of weak public policy response, sociological displacement and flagging business opportunity altered the community's outlook and recovery.

Three years later Galveston Island, by contrast, transformed the New Orleans Parish experience into an effective public policy plan that leaders successfully executed. Moreover, the Galveston economy was stable, even in the face of a population decline driven by home cost, not economic opportunity. Finally, the level of physical destruction and human displacement was far smaller in proportion to the city size. Galveston business and civic leaders swiftly and effectively accessed funds and resources, began repairing and rebuilding physical damage and conducted major tourist events like Dickens on the Strand and Galveston Mardi Gras on their regularly scheduled dates. These material differences defined a hurricane recovery profile for Galveston Island that was more robust than that for New Orleans Parish.

### SUMMARY

Gulf coast communities periodically suffer the ravages of Atlantic hurricanes. The duration and strength of a community's recovery depends on a combination of local preparedness, public policy coordination and the extent of damage to key industry sectors. Learning from Katrina's devastating strike on New Orleans Parish in August 2005, Galveston Island officials re-designed their local storm recovery policies. Immediately after Hurricane Ike's landfall, September 13, 2008, local and regional authorities successfully launched a coordinated multi-governmental recovery plan.

Notable differences appear in each city's recovery profile ten to twelve months after their respective hurricane strike. Though the two Gulf coast cities' experience may appear similar--both have port and tourism export industries and a large proportion of low wage jobs--material differences in demographic history, public policy storm response and the degree of physical damage are compelling. New Orleans Parish population had been declining for fifteen years prior to Katrina and major export industries like tourism supported mostly low wage occupations. Katrina's storm surge inundated 80 percent of the city east of the French Quarter. Ten months after the storm, both population and total industry activity had declined 40 percent. Only one of three major export industries, educational services, was near pre-storm employment levels. Tourism, the largest export industry, had only half its pre-storm employment.

Galveston Island's population also had been declining for over a decade. Tourism was the largest of three export industries that included the Port of Galveston and healthcare. Yet a rapidly growing Houston region population frequented Galveston's beaches and sport fishing venues. Galveston Island officials

Table 3

New Orleans Parish Employment by Selected Industry Sectors					
Industry	2000 Qtr 2	2004 Qtr 2	2005 Qtr 4	2006 Qtr 1	2006 Qtr 2
Port activity	19,500	14,600	11,500	11,100	11,600
Tourism	42,600	43,200	18,200	20,000	23,000
Educational Svcs	7,500	9,500	6,000	7,300	8,000
Health & Social	26,600	26,100	11,100	9,700	10,000
Construction	7,900	6,400	5,300	7,200	7,400
Professional Svcs	13,400	13,900	11,800	12,500	12,500
Retail	21,200	19,000	7,200	7,900	9,300
Total	266,500	249,900	144,200	142,400	150,800

Source: Dolfman, M. et al. (2007, June) *Monthly Labor Review*, 3-18.



took notice of New Orleans' storm experience, then created and executed what proved to be an effective multi-faceted hurricane response policy. While serious, post-storm physical destruction on the island reduced total property tax revenues to the city by an estimated \$0.5 million annually. Twelve months after the storm Galveston's total employment had rebounded to 98 percent of its pre-storm level. The quarterly year-over-year percent change in taxable industry sales fell through the second quarter 2008, though construction changes were significantly positive and the negative retail change ameliorated over time. Year-end taxable sales revenue to the City of Galveston was over \$1 million greater in 2009 than for 2008. In sum, Galveston's coordinated post-storm response, proportionately smaller physical damage and human displacement along with sustained recovery efforts to repair and re-establish the island's industry and sense of community describes the major differences in post-hurricane response between these two Gulf coast cities.

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# SOME DETERMINANTS OF LOCAL DISCRETIONARY SPENDING BY COLLEGE STUDENTS

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## INTRODUCTION

Spending by all college students has been identified as an important component of total consumer spending in the United States (Harris Interactive/Newsroom, 2002) including an average of \$287 a month on discretionary items (i.e., not on tuition, school fees, room and board, and books) and nearly \$1000 on back-to-college merchandise (National Retail Federation, 2007).

Since much of this discretionary and back-to-college spending will take place in university communities, spending by college students has strong impacts on the economic health of local communities. When the local residential college is large relative to the size of the community these impacts are critical to the economic life of the community. Colleges, through their current spending and employment, are often seen as important drivers of the local economy and as potential catalysts for local economic development (O'neal, 2007; Bailey, et al., 2007), and spending by their students magnifies these effects.

What factors are important in decisions about how much a particular student spends in the local university community? In standard neoclassical microeconomic theory, expenditures are determined indirectly through demand functions obtained by the familiar constrained utility maximization approach. Demand functions are generally depicted with income and prices as primary determinants, while other demand-related factors vary according to the particular good or service under consideration. Utility maximization leads to an optimal allocation of the consumer's time and money resources to the various goods and services (including leisure time) purchased. How might this allocation problem be viewed in the context of student expenditures in the local economy?

Many college students are living temporarily away from home in the communities where they attend school and their local spending levels are, to some extent, the result of intra-family allocation decisions that are not made by the students alone. The utility function being maximized is a blend of the family members' preferences, and the constraint is a function of family resources. For example, students living off-campus must purchase food in local grocery stores, buy meals from restaurants in the local area, or purchase food in their hometowns and bring it to their local residences. Different students and their families will allocate food purchases among these three sources differently. Once the student's budget for local spending is determined, what factors might cause variations across students in spending on different categories, such as recreation?

In this paper we analyze the spending behavior of traditional college students. This analysis is based on a random sample of undergraduate students, stratified by gender and academic class level, and their spending behavior in the local area while attending classes. Then we employ regression analysis to examine the impacts of a wider variety of potential determinants of student spending.

We find that total spending is influenced by a variety of socio-economic factors including parent's education level, hours spent studying or working, number of bar visits, choice of living on- or off-campus and urban/rural location of their home. Some subgroups of spending are also influenced by the level of financial (positively) and non-financial (negatively) stress felt by the student. Some differences in spending behavior by gender and class-standing is also found.

## THE MODEL

In order to view this allocation problem within the standard framework in which utility is a direct function of the quantities of each good purchased, we can treat the same good purchased for three different purposes or at different locations as three distinct utility function arguments. That is, let  $U = U(Z_i)$ , where the  $Z_i$  ( $i=1, \dots, N$ ) are vectors of quantities of  $M$  goods and services ( $Z_{ij}$ ,  $j = 1, \dots, M$ ).<sup>1</sup> It is possible for  $Z_{ij}$  and  $Z_{kj}$ ,  $i \neq k$ , to be perfect substitutes (a bag of cookies purchased in the hometown is the same, for example, as one purchased in the university community), or not (entertainment services purchased in the two locations). Associated with the  $Z_i$  are price vectors  $P_i$  (with the  $P_{ij}$  being the individual prices by "location"). These  $P_{ij}$  can vary not only across the  $M$  goods and services, but also across  $i$  for a given  $j$ . This latter variation can occur because either the actual (retail) prices of goods and services may vary according to where it is purchased (home or university community), or there is a different time cost associated with the transactions.

We view the intrafamily allocation decision(s) as being in two parts. First, the family as a whole decides the components of  $Z_2$  and  $Z_3$  (spending on the student in the home town and spending on other family members). The student then determines the components of  $Z_1$ , which will depend on the  $Z_2$  and  $Z_3$  as well as on the resources available to the student, either provided by the family or the student's own resources from a job, etc. Available resources are effectively the income constraint facing the student; we will assume that these resources are spent in their entirety, so that measured student spending on the vector  $Z_1$  is interpreted as the student's income constraint. This constraint comes in part from the family's decisions regarding  $Z_2$  and  $Z_3$ .

Our data source for the empirical estimates of expenditure determinants is a survey of students regarding their expenditures in the local university. We therefore do not have information on the  $Z_i$  individually, even for  $Z_j$ . Instead, the survey provides us with student expenditures on some of the  $Z_i$ . As explained in detail in the next section, we have expenditure data on “total discretionary purchases,” on “store spending,” and spending on “recreation.”

Let  $E_R$  be recreation spending,  $E_S$  be store spending, and  $E_T$  be total discretionary spending. We take the reported value of  $E_T$  to be the student’s budget constraint when making local purchases. In general, then  $E = \sum_j P_j Z_{ij}$ , with various  $Z_{ij}$  taking the value of zero depending on which  $E$  is considered. The equation estimated for total discretionary spending is:

$$\ln E_{Tf} = \beta_0 + \sum_g \beta_g X_{gf} + \varepsilon_{Tf}; \quad (1)$$

where  $f$  is the individual respondent index, whose maximum value varies across the variables in our data set; the  $X_g$  are the explanatory variables; the  $\beta$ ’s are the coefficients to be estimated; and  $\varepsilon$  is the error term. We estimated similar log-linear equations for  $E_R$  and  $E_S$ . We used the log-linear functional form because early runs of the regressions revealed much better behaved residuals for that form—not surprising given that the actual values of the spending variables are skewed rightward. The equations were estimated using both ordinary and two-stage least squares, the latter because some of the independent variables were shown by Hausman tests to be endogenous.

## SURVEY METHOD AND DATA

Many empirical studies of college students’ use of credit cards or attitudes toward money employ so-called “convenience samples,” such as surveys distributed in classrooms, dormitories or cafeterias (Davies and Lea 1995; Xiao et al. 1995; Eastman et al. 1997; Warwick and Mansfield 2000; Roberts and Jones 2001; Kidwell and Turrisi 2003; and Hayhoe et al. 2005). These convenience samples are non-random selections from the student population, and therefore create problems for interpretation of results and bias inferences about the general student population. For example, survey answers from students in an introductory-level child development class are likely to be different from students in a senior-level finance course. The nature and strength of these biases are typically unknown. Other studies survey a wide range of randomly selected students but obtain low response rates that suggest a potential unknown and unmeasured response bias (Medina et al. 1996; Markovich and DeVaney 1997; Hayhoe et al. 1999; Leach et al. 1999; Hayhoe et al. 2000).

In contrast, the data used in the present analysis was derived from information collected through a stratified random sample telephone survey conducted by the Center for Applied Research and Rural Studies (CARRS) at Central Michigan University (CMU). The Registrar’s office used all undergraduate students enrolled on the main campus of CMU in the spring 2005 semester (a population of roughly 18,000) to provide a randomly selected list of students stratified by gender and class standing. We opted for a telephone survey since it assured us of a stratified random

sample. Eliot (1988) concluded that responses by students to questions about their spending behavior are not influenced by whether the survey was conducted by telephone or mail.

CARRS conducted the survey during one week in March 2005 using students from two undergraduate social science research methods courses as interviewers. The use of students to complete the interviews might improve the accuracy of the data as student respondents might be more relaxed and respond more openly to fellow students than to older adults. Calls were placed to 2,250 telephone numbers, of which 880 calls were answered and 503 surveys were completed. The overall response rate was 22 percent (503/2250), but 57 percent (503/880) of the students who answered phone calls participated in the survey.

The survey instrument was composed of four parts for four separate research projects. To reduce the length of the survey and avoid respondent fatigue, two parts of the survey were answered by all respondents while the other two parts, including questions on spending behavior, were answered by one-half (251) of the respondents. Allowing for coding errors, etc., our sample was reduced to 247 respondents. We believe this is a high-quality data set because of the stratified random sample selection process and the high participation rate. Most of the demographic proportions in the data closely match the CMU student population.

One part of the survey collected extensive personal information regarding the respondent’s involvement in student organizations, number of work hours, number of study hours, the degree to which the respondent felt financial and non-financial stress, their current housing situation, drinking habits, a description of their home town (rural or urban) and parents’ education.<sup>2</sup> Information regarding each student respondent’s gender, class standing, major, age and grade point average were obtained from the CMU Registrar’s office.

Other survey questions asked for information regarding the student’s typical local spending during the months they spent on campus (i.e. late August through mid-May). All surveyed students were asked the amount they spent during a typical week on recreation and in retail stores. Respondents living off campus, but not at home with parents, were asked about monthly expenditures for communication services (telephone, local cell phone, cable television and internet access). Students who reported having access to a car (83% of the sample) were asked about gasoline expenses.

The dependent variables examined in our analysis are retail store spending (**SpendStore**), recreation spending (**SpendRec**) and total discretionary spending (**SpendTotal**), all on a monthly basis. The first two are derived directly from survey questions with responses multiplied by 4.33 to convert the reported weekly figure to a monthly figure. The last one is the sum of the first two plus communication services and gasoline.<sup>3</sup> We chose to focus our study on these three since we believe students may have the most discretion in spending in these spending categories.

## SOME EXPECTED RELATIONSHIPS

How might each of these independent variables affect the three types of spending? For some variables we can justify a prediction of either a positive or a negative effect, but for others, reasonable stories can be told to support either direction. We report results involving the same independent variables for each of the three spending categories, which allows for a comparison of the impacts of a given factor on different types of spending.

### Time allocation

The **HrsWork**, **HrsStudy**, and **HrsOrg** variables would affect spending through their impact on the student's available time. In addition, **HrsWork** would also affect money income. It would seem that only recreation spending would be affected by time constraints, since such spending is generally undertaken while spending time in an activity such as watching a movie or participating in intramural athletics. Thus, a greater amount of time spent working, studying, or participating in student organizations would lower spending, since less time would be available for recreation activities; the coefficients on **HrsWork**, **HrsStudy**, and **HrsOrg** would therefore tend to be negative. On the other hand, more work means higher income, making possible a higher level of recreation spending; the net effect on recreation spending of more hours worked is therefore unclear. With respect to spending in stores, we see no compelling a priori arguments for specific signs on these time variables, except for work hours, which might be expected to be positive since it increases the student's money resources. It is possible that, for example, the sort of student who spends greater amounts of time studying or in student organizations does so because of background factors that would tend to make them spend either more or less in stores.

If more income leads to increased spending, the coefficient on the expected income variable (**ExpY**) would be positive,

Respondents reported the number of hours per week they spent working for pay, studying, and working for a registered student organization. These reported hours were multiplied by 4.33 to create the per-month variables **HrsWork**, **HrsStudy**, and **HrsOrg**, respectively. The financial stress variable (**StressF**) was derived from a question which asked the student to rate the degree of financial stress they felt on a 1 to 7 scale with 1 being "totally relaxed" and 7 being "totally stressed out." This same scale was used in three separate questions regarding the amount of stress arising from academics, roommates, and the respondent's "significant other." The non financial stress variable (**StressNF**) for each individual is the sum of their responses to these questions and thus has a range of 3 to 21.<sup>4</sup> **OffCampus** takes the value one if the respondent lived off campus and zero otherwise. In the survey students were asked how often they drank alcohol in a bar or nightclub. In constructing the variable **BarVisits** a response of less than once a month to this questions was assigned a value of zero, one to three times a month a value of two and a response giving the number of times per week was multiplied by four to obtain a monthly figure. **Rural** equals one if the student described the area in which he or she grew up as rural or a small town and zero otherwise. In constructing the parent education variables (**EdFather**, **EdMother**) we assumed a response of "less than high school" indicated 10 years of education; "high school graduate" was entered as 12 years; "some college" as 14 years; "four year college degree" as 16 years; "some graduate school..." as 18 years; and "graduate degree..." as 20 years. **NonTrad** equals one if the respondent is 25 or older and zero otherwise. **JrSr** and **Female** equal one if the student is an upperclassman (i.e. junior or senior) or a woman and zero otherwise. For those respondents with a declared major we used the National Association of Colleges and Employers Salary Survey (2006) to obtain an estimate of expected salary (**ExpY**). If the student had not declared a major we used the college graduate average from the same publication. We used information provided by CMU's Registrar to determine a student's major, which was then used to derive **GPar**, the student's grade point average relative to (i.e. divided by) the average grade point for that major or the student's college. The denominator in the calculation is the weighted average grade point for the course designator of required courses and commonly taken electives in the major.<sup>5</sup> For freshmen and sophomores without a declared major we used their grade point average relative to the average for all lower division courses (i.e. 100 and 200 level courses). Juniors and seniors without a declared major were similarly treated except a weighted average of lower and upper division courses was used in the calculation.

Three variables have to do with a student's location. The first, **1/2to2HrsHome**, equals 1 (zero otherwise) if the driving time to the students hometown exceeds 30 minutes but is less than 2 hours; similarly, the variable **Over2HrsHome** is equal to 1 for students whose hometowns require more than a two-hour drive to reach. The dummy variable **WorkInCounty** equals one (zero otherwise) if the student works in the county where the university is located.

Table 1 contains some basic information about the variables used in the analysis.

Variable Name	Description	Type	Mean	Standard Deviation
SpendRec	Total recreation spending	continuous	151.04	153.96
SpendStore	Total store spending	continuous	129.12	161.78
SpendTotal	Total discretionary spending	continuous	367.94	319.83
BarVisits	Monthly number of bar visits	continuous	2.39	4.23
EdFather	Father's years of education	continuous	14.97	2.85
EdMother	Mother's years of education	continuous	15.13	2.52
ExpY	Expected Salary in thousands	continuous	34.89	3.62
GPar	Relative grade point average	continuous	1.02	0.22
HrsOrg	Monthly hours worked at student organization	continuous	13.93	20.1
HrsStudy	Monthly hours studying	continuous	55.22	39.05
HrsWork	Monthly hours of working for pay	continuous	46.05	66.36
JrSr	Junior or Senior status	binary	0.59	
NonTrad	Age 25 or older	binary	0.085	
OffCampus	Living off campus	binary	0.44	
Rural	Hometown rural or small town	binary	0.49	
Female	Female student	binary	0.59	
StressF	Degree of financial stress	scale (1-7)	3.94	1.81
StressNf	Degree of non financial stress	scale (3-21)	10.08	3.34
1/2to2HrsHome	Lives within a 1/2 to 2 hour drive	binary	.4494	
Over2HrsHome	Lives more than 2 hours away	binary	.4494	
WorkInCounty	Works in the university county	binary	.4089	



although this is more like a measure of permanent rather than current income. The expected impact of relative GPA (**GPA<sub>r</sub>**) is unclear, since study time is controlled for otherwise, but one might argue that high **GPA<sub>r</sub>** students have some background factor that makes them less likely to do a lot of recreation spending. (In our initial discussions of the motivators of student spending we referred to this, probably inaccurately, as the “nerd effect.”) Another variable measuring a dimension of students’ behavior is **BarVisits**, whose coefficient we would expect to be positive for recreation spending. Finally, as is the case for all of our independent variables, we generally expect that a given variable would affect total discretionary spending in the same direction it affects either of the components.

## Family characteristics

Three independent variables (**Rural**, **EdFather**, and **EdMother**) are included as potentially significant information about a student’s background. A student from a rural area or small town (**Rural** = 1) might be used to a slower lifestyle, involving less spending; this variable might also be a proxy for family income (on which we have no direct data), which tends to be lower on average in rural areas. Likewise, **EdFather** and **EdMother** would tend to be correlated with family income, which implies a positive coefficient. More educated parents might also place a higher value on their time, which might lead them to turn the purchasing duties for college-related items over to the student, again yielding a positive coefficient for these two variables (assuming the student does at least part of this spending in the local university community). These points likely apply to all three spending measures.

A negative relationship between mothers’ education levels and student spending is also possible. A study on the transmission of financial literacy within families (Clarke et al. 2005) suggests that mothers have a greater influence than fathers in demonstrating budgeting and savings behavior. Although fathers were viewed as the overall financial managers in a family, offspring who felt best prepared to make financial decisions had mothers who taught financial skills. If there is a positive correlation between mothers’ education levels and the extent to which they model and teach good financial behavior to their children, and if a greater degree of financial literacy among students is associated with lower (i.e., more careful) spending, then the Clarke et al. (2005) findings would suggest that having a more educated mother would cause a student to spend less, all else equal.

## Student characteristics

Four of the independent variables (**OffCampus**, **JrSr**, **NonTrad**, and **Female**) describe personal student characteristics. Students living off-campus may or may not spend more on recreation than on-campus residents, but would likely spend more in stores since they would have to purchase more groceries than residence hall dwellers, most of whom would have some sort of meal plan. We expect that students in the upper academic classes spend more both on recreation and in retail stores than sophomores and freshmen, partly because they are more likely to be over 21 and therefore legally able to purchase alcohol.

Non-traditional students (here this means 25 years old and older) are more likely to have families and therefore would be spending for others as well as themselves, a factor that would tend to increase store spending and, to a lesser extent, recreation expenditures. Finally, if females are more likely than males to view shopping as a recreational activity (a notion which seems to be common popular lore), the coefficient on **Female** will be positive, at least for the store spending equation.

## Proximity to home

The variables **1/2to2HrsHome**, **Over2HrsHome**, and **WorkIn-County** are used to examine the impact of commuting behavior between home and the campus locale. We expect that students whose home towns are within one-half hour of campus will have the highest local spending because they effectively live within the local area (county) defined in the survey. Students whose hometowns are more than one-half but less than two hours away are likely to go home on a regular basis, reducing both recreation and store spending in the university community. There might be a similar effect for students whose hometowns are more than two hours from campus, but they are likely to go home less frequently than the group living between ½ and 2 hours from campus. If a student works in the county where the university is located, that student would tend to spend more in the local community because the job may require working on weekends, meaning that the student would go home less often.

## Types of stress

There is some evidence from the literature, mainly in the fields of marketing and psychology, suggesting that students’ stress levels could affect their spending behavior. For example, Roberts and Jones (2001) found that compulsive buyers will tend to shop more in an attempt to reduce stress levels, but such attempts may lead to even greater stress. This not only suggests that, at least for such buyers, higher stress leads to greater spending, but also that stress is itself endogenous. Hayhoe et al. (2000) find that a higher level of financial stress causes college students to purchase more goods. Davies and Lea (1995), in a study of student attitudes toward debt, looked at the impact of stressful life events on students’ total expenditures; they found that higher numbers of negative experiences (presumably positively correlated with higher stress) are associated with higher spending. Another way that stress can affect spending behavior is in the area of shopping that is done to help relieve stress. Hama (2001), in a study based on answers to questionnaires given primarily to undergraduate students in Japan, gives the term “diversion buying” to shopping done as an emotional coping behavior. Hama finds that 1) females are about twice as likely to engage in such behavior as males; 2) spending tends to reduce stress initially, but “guilt” can set in, potentially leading to more stress. Based on these results one might predict that higher stress increases spending (as buyers attempt to reduce that stress), but also that the increased spending may tend to increase stress (i.e., stress may be endogenous).

There are four stress-related variables in the present analysis (**StressF**, **StressNF**, **Fem\_StressF**, and **StressNFSq**). The financial stress variable (**StressF**) and the nonfinancial stress



variable (**StressNF**) were described earlier in this section, along with some reasons for *a priori* expectations about the signs of some coefficients. Generally speaking, we hypothesize that both greater financial stress and greater nonfinancial stress would cause students to spend more. On the other hand, another possibility is that higher financial stress would lead to lower spending, as students react to financial difficulties by cutting all “unnecessary” spending.

We also included an interactive term between **Female** and **StressF**, and the square of **StressNF**. The interactive term was included based on Hama (2001), who suggests that females are more likely to shop as a stress-reducing behavior, and because of the apparently widely-held perception that females are more prone to engage in “retail therapy.” The squared term was included (as were the squares of some other non-stress variables) because initial analyses indicated the likelihood that some nonlinearities exist among the relationships examined here.

All of these *a priori* expectations could apply to each of the three spending measures examined in the present paper, but it is likely that some independent variables would have a larger impact on one area of spending than another.

## EMPIRICAL RESULTS

We first discuss the results for each spending type individually and then provide a comparison of the impact of independent variables across spending types. The tables report coefficients and associated p-values along with an adjusted R<sup>2</sup> and Akaike Information Criterion (AIC) statistic for each model. We emphasize the results from the OLS estimates of the equations, but also discuss outcomes of 2SLS versions that treat measures of student stress as endogenous.<sup>6</sup> Four OLS models are presented for each spending type: no stress variables, only financial stress, only nonfinancial stress, and both types of stress. In addition to the variables described above, we also included the squares of some independent variables that appeared to have a nonlinear impact.

### OLS Results

#### Total Discretionary Spending

Table 2 shows the OLS results for Total Discretionary Spending, which is the sum of store, recreation, gasoline, and telecommunications spending. None of the four models stands out as clearly superior to the others in terms of statistical criteria, so the remainder of this discussion will focus on the model with all of the predictors included (the rightmost two columns of Table 2). With the exception of stress variables, of which none is statistically significant, at least two variables from each of the other categories outlined above (time usage and resources, student background, student characteristics, and locational measures) have p-values less than 0.1. In the first category, the variables **BarVisits**, **GPA** squared<sup>7</sup>, **HrsStudy** and its square, and **HrsWork** are all statistically significant, and **GPA** has a p-value of .1166.

The coefficient on **BarVisits** indicates that each additional bar visit per month increases total monthly spending by about 3%, or \$12. Put another way, the results suggest that during an average bar visit a student in our sample spent \$12.

Even though **GPA** is not quite significant at the 10% level, we can pair it with its square (p-value = .05) to derive a measure of the impact of a higher GPA. Taken together, the two coefficients tell us that spending rises with **GPA** until **GPA** = .79, at which point the slope becomes negative. Thus, for students whose grades are higher than average within their major (holding constant the number of hours spent studying), a higher **GPA** reduces spending, which could be interpreted as a confirmation of the “nerd effect”—students with good grades tend to engage in activities involving lower monetary outlays.

Somewhat in contrast, spending increases as the number of hours spent studying increases—about 4% for a 10-hour increase in study time. Although the square of **HrsStudy** is negative and statistically significant, its impact is small—**HrsStudy** must reach about 100 per month (about two times the average) before the square term dominates and the slope becomes negative. **HrsWork** is significant and positive but not very large, with a 10 hour per month (22% on average) increase in work hours causing spending to increase by only 1.5%. Possible explanations for the small effect of increased resources on spending are 1) many students work to pay tuition, book expenses, etc., and that is where the bulk of their earned income goes; and 2) more hours at work leave fewer hours for other activities, including those that are complementary to spending, thus countering in part the positive spending effect of more income.

	Coef.	p	Coef.	p	Coef.	P	Coef.	p
(Constant)	4.780**	0.000	4.508**	0.000	5.118**	0.000	4.976**	0.000
BarVisits	0.030**	0.006	0.030**	0.005	0.029**	0.006	0.030**	0.005
EdFather	0.028*	0.098	0.030*	0.081	0.028*	0.094	0.031*	0.072
EdMother	-0.046*	0.021	-0.046*	0.020	-0.041*	0.036	-0.043*	0.028
ExpY	0.012	0.316	0.012	0.343	0.005	0.688	0.004	0.769
GPA	1.630	0.194	1.745	0.165	1.786	0.146	1.929	0.117
GPA <sup>2</sup>	-1.085*	0.090	-1.113*	0.081	-1.180*	0.059	-1.222*	0.050
HrsOrg	-0.0076	0.116	-0.0078	0.109	-0.0080*	0.098	-0.0078	0.108
HrsOrg <sup>2</sup>	0.00005	0.294	0.00004	0.309	0.00005	0.264	0.00004	0.318
HrsStudy	0.0032	0.163	0.0034	0.142	0.0039*	0.095	0.0040*	0.088
HrsStudy <sup>2</sup>	-0.00002*	0.071	-0.00002*	0.061	-0.00002*	0.027	-0.00002*	0.025
HrsWork	0.0013*	0.072	0.0013*	0.065	0.0014*	0.083	0.0015*	0.071
JrSr	0.364**	0.003	0.343**	0.005	0.386**	0.001	0.365**	0.003
NonTrad	0.096	0.541	0.114	0.468	0.112	0.505	0.118	0.485
OffCampus	0.393**	0.001	0.382**	0.002	0.325**	0.007	0.308**	0.011
Rural	-0.122	0.156	-0.123	0.154	-0.167*	0.055	-0.165*	0.058
Female	0.016	0.861	0.086	0.672	-0.055	0.559	0.054	0.789
StressF			0.052	0.146			0.056	0.117
Fem_StressF			-0.023	0.631			-0.029	0.538
StressNF					-0.042	0.481	-0.059	0.331
StressNF <sup>2</sup>					0.003	0.262	0.003	0.193
1/2to2HrsHome	-0.410**	0.006	-0.406**	0.006	-0.406**	0.010	-0.419**	0.008
Over2HrsHome	-0.244*	0.099	-0.233	0.115	-0.278*	0.072	-0.282*	0.068
WorkInCounty	-0.019	0.840	-0.007	0.938	-0.075	0.432	-0.063	0.509
Adj. R-sq.	0.4005		0.4033		0.4155		0.4187	
A.I.C.	-209.03		-208.31		-209.64		-209.10	
Observations								

<sup>a</sup> Coefficients marked \* are significant at the 10% level and those with \*\* at the 1% level

All three of the student background variables are statistically significant for this model. Rural students' total discretionary spending is approximately 16% less than that of other students, perhaps reflecting the slower pace of rural life or lower family income. The two parent education variables are also statistically significant, with a positive coefficient for **EdFather** and a negative one for **EdMother**. The **EdMother** coefficient is also larger in absolute value (.0431 versus .0305) than the **EdFather** coefficient, which suggests that mothers may have more influence on family and their children's spending than fathers. These results are consistent with our earlier discussion regarding the literature on the transmission of financial literacy within families (Clarke et al. 2005). The net effect of one year increases in both the mother's and father's level of education is to reduce spending by about 1.25%.

Two (**JrSr** and **OffCampus**) of the four student characteristic variables are statistically significant and have the predicted positive signs. Juniors and seniors jointly spend 36.5% more than freshmen and sophomores, while those living off campus spend just over 30% more than those living in residence halls or at home with their parents. On the other hand, being female or a non-traditional student (age 25 or older) did not have an impact on spending.

None of the stress related variables has statistically significant coefficients for the total discretionary spending models (although we will see below that they have an influence on one component, recreational spending). Two (**1/2to2HrsHome** and **Over2HrsHome**) of the three location variables do have significant coefficients of the expected sign, and the relative sizes of the coefficients make sense as well. As expected, students who live more than a half-hour from campus have lower spending than those who live closer. Those living between

a half-hour and 2 hours from campus spend about 42% less than nearby residents, and students living more than 2 hours away spend 28% less. This makes sense in the context of trips home during a semester—those living less than 2 hours away go home on weekends the most often, reducing their spending in the local university community by a substantial amount. Those living farther away spend less than local residents, but their spending is still higher than those one-half to two hours away; this is because the longer distance reduces the number of weekend trips home, leaving students in the local area for more weekends.

## Recreation Spending

The results of the OLS recreation spending models are presented in Table 3. Most predictors either have coefficients of the expected sign or are not statistically significant. Among the time allocation and income variables, only **HrsStudy** and the squares of **GPA** and **HrsStudy** were significant. Since the coefficients on the square of **HrsStudy** are negative, the impact of higher study times diminishes as **HrsStudy** increases, but the net effect is still positive throughout the majority of the range of values for **HrsStudy** in the data set. Thus, students who study more to achieve the same relative GPA spend more on recreation, a puzzling result that runs counter to our expectation regarding time allocation. Although the expected income variable **ExpY** has the predicted positive effect in each recreation spending model, it is not significant in any of them. The coefficient on **BarVisits** is of the expected positive sign and is statistically significant in all four recreation spending models; the results show that each additional bar visit in a month increases monthly recreation spending by between 5% and 6%. This represents an increase of about \$9 per month, which is reasonably consistent with the result for total spending as discussed above.

Only one of the student background variables, **Rural**, is significant and of the expected sign; the parent education variables **EdFather** and **EdMother** are not statistically significant. A student with a rural or small town background spends about 25% less on recreation than students from more densely populated areas, consistent with our *a priori* expectations. None of the student characteristic variables (**OffCampus**, **JrSr**, **NonTrad**, and **Female**) or locational variables (**1/2to2HrsHome**, **Over2HrsHome**, and **WorkInCounty**) appears as statistically significant in the recreation models.

All of the stress variables appear to be important, particularly when all appear jointly in a model (rightmost column of Table 3). The results of that model suggest that males increase recreational spending by over 9% when their financial stress levels increase by 1 point on the seven-point scale. The interaction variable indicates that females react differently—they decrease such spending when financial stress increases, but only by about 1.7% (.096 + (-.113) = -.017). Perhaps the result indicating that students increase their spending as a reaction to higher financial stress levels is evidence that recreation is undertaken to help reduce the impact of the stress. That greater financial stress is accompanied by higher spending would seem to be in line with Roberts and Jones (2001) and Hayhoe et al.

TABLE 3  
OLS Results: Recreation Spending<sup>a</sup>

	Coef.	p	Coef.	p	Coef.	p	Coef.	p
(Constant)	3.660**	0.000	3.296**	0.001	3.698**	0.000	3.482**	0.001
BarVisits	0.060**	0.000	0.059**	0.000	0.057**	0.000	0.056**	0.000
EdFather	0.012	0.537	0.012	0.531	0.006	0.766	0.007	0.724
EdMother	-0.005	0.827	-0.009	0.682	0.007	0.741	0.002	0.914
ExpY	0.012	0.401	0.011	0.404	0.022	0.130	0.021	0.158
GPA	1.707	0.229	1.859	0.187	1.771	0.206	1.972	0.156
GPA <sup>2</sup>	-1.064	0.142	-1.103	0.124	-1.171	0.101	-1.229*	0.082
HrsOrg	-0.0058	0.289	-0.0050	0.362	-0.0091	0.098	-0.0081	0.137
HrsOrg <sup>2</sup>	0.00005	0.356	0.00004	0.455	0.00007	0.148	0.00006	0.217
HrsStudy	0.0031	0.241	0.0027	0.314	0.0053*	0.053	0.0051*	0.062
HrsStudy <sup>2</sup>	-0.00001	0.227	-0.00001	0.291	-0.00002*	0.067	-0.00002*	0.076
HrsWork	0.0012	0.127	0.0011	0.183	0.0007	0.468	0.0006	0.524
JrSr	0.163	0.239	0.146	0.290	0.238	0.085	0.217	0.114
NonTrad	0.214	0.229	0.238	0.178	0.248	0.199	0.251	0.189
OffCampus	0.044	0.746	0.039	0.774	0.025	0.858	0.008	0.956
Rural	-0.244*	0.013	-0.247*	0.012	-0.249*	0.012	-0.246*	0.013
Female	-0.140	0.172	0.290	0.204	-0.124	0.258	0.306	0.180
StressF			0.091*	0.022			0.096*	0.017
Fem_StressF			-0.114*	0.031			-0.113*	0.033
StressNF					-0.107	0.130	-0.132*	0.062
StressNFSq					0.005	0.134	0.005*	0.070
1/2to2HrsHome	-0.230	0.171	-0.224	0.178	-0.175	0.326	-0.180	0.308
Over2HrsHome	-0.157	0.344	-0.163	0.324	-0.121	0.490	-0.131	0.449
WorkInCounty	-0.123	0.239	-0.097	0.352	-0.063	0.564	-0.041	0.708
Adj. R-sq.	0.2229		0.2368		0.2592		0.2744	
A.I.C.	-150.62		-152.93		-151.52		-154.28	
Observations								

<sup>a</sup> Coefficients marked \* are significant at the 10% level and those with \*\* at the 1% level

(2000), as described above, but those earlier findings were based largely on the purchases of goods, which would likely be classified as store spending in the present work. Perhaps in this case the recreation spending is an attempt to relieve stress, not through the mechanism assumed in the earlier work (that the spending is itself a stress reduction activity), but rather by purchasing an activity that will in turn help reduce stress.<sup>8</sup>

Nonfinancial stress shows a u-shaped effect. That is, spending declines as non-financial stress increases, up to a stress level of about 12 (the mean is 10.8), after which further increases in nonfinancial stress *increase* spending. These results suggest that a given student could either increase or decrease recreation spending as nonfinancial stress increases, depending on the stress level perceived by that specific student. Nevertheless, from low through moderate levels of stress, an increase in nonfinancial stress decreases (albeit at a decreasing rate) spending on recreation. This seems odd; one might expect that students with higher levels of stress would be more likely to want to take a break from the stress by engaging in recreational activities. It is possible that higher levels of stress make students less interested in recreation, either because they must devote more time to dealing with the problems causing the stress, or simply that the stress makes them less able to enjoy recreational opportunities. There might also be some sort of threshold effect, requiring nonfinancial stress to be relatively strong before students (males) turn to recreational activities to relieve it.

### Spending in Stores

Table 4 presents the OLS results for spending in stores, including purchases of groceries. Only 6 independent variables (**HrsOrg** and its square, **HrsWork**, **JrSr**, **OffCampus**, and **Female**) are statistically significant in any of the four models, and only four of these (**HrsOrg** and its square, **HrsWork**, and **JrSr**) are significant across all models. Students who spend more time in student organizations spend less in stores; an increase of ten monthly hours in that activity reduces store spending by about 13%, or about \$17 per month. The square of **HrsOrg** is positive and statistically significant at the 10% level in all four models, but its impact is small and does not begin to dominate **HrsOrg** (resulting in a positive slope) until its value reaches about 76 hrs. per month, well in excess of the average of 14 hours per month.

Students who work more spend more, but not much more. The coefficient on **HrsWork** is positive and statistically significant in all four models, which means that the effect of having more income outweighs the effect of having less time to spend it. But the coefficient has a value of roughly .002, which means that a ten hour per month increase in working hours (about 22% for the average student) yields only a 2% increase in spending, for an elasticity value (expenditures in stores with respect to hours worked) less than 0.1. Academic class has a large impact on store spending, with juniors and seniors jointly spending about 42% more than freshmen and sophomores.

Two variables are statistically significant in some models but not in others. The coefficient for **OffCampus** has the expected positive sign but is only significant in the models that exclude

nonfinancial stress. The sizes of the coefficients suggest that students living off campus spend 20-25% more than those living in residence halls or with their parents. Females may spend as much as 25% more in stores than males, but the coefficient on **Female** is not significant (although the p-value rises to only the .12-.14 range) when the interaction between **Female** and financial stress is included. Although the results do show that females spend more in stores, such spending is apparently not stress related. This may or may not be evidence supporting the widely-held notion that females spend in stores as a recreational activity. (Of course, they may spend many hours shopping without actually purchasing very much, raising the question of whether “retail therapy” consists of just looking or actual spending.)

### A Comparison Across Spending Types

Table 5, which summarizes some aspects of the OLS results, allows us to make a simple visual comparison of the impact of a given variable on the different types of spending. It is based on Tables 2, 3, and 4, using the model that includes all the predictor variables for each spending type. First note that no predictors are statistically significant in all three spending models; this is because no variables are statistically significant in both of the spending sub-types, recreation and store spending. This is not surprising, since recreation spending and store spending are undertaken for largely different purposes. There are seven predictors (**BarVisits**, **GPA**, **HrsStudy** and its square, **HrsWork**, **JrSr**, and **Rural**) that are significant and of the same sign in the total spending model and one of the other models, and of the same sign in the third model but not statistically significant.

TABLE 4  
OLS Results: Store Spending<sup>a</sup>

	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
(Constant)	3.425**	0.001	3.443**	0.002	3.963**	0.001	3.989**	0.001
BarVisits	0.010	0.466	0.010	0.462	0.011	0.414	0.011	0.414
EdFather	0.023	0.310	0.023	0.296	0.026	0.250	0.026	0.250
EdMother	-0.024	0.344	-0.022	0.379	-0.022	0.394	-0.021	0.420
ExpY	0.004	0.802	0.004	0.817	-0.002	0.922	-0.002	0.923
GPA	1.241	0.438	1.237	0.442	1.312	0.416	1.298	0.424
GPA	-0.865	0.285	-0.866	0.287	-0.900	0.270	-0.898	0.273
HrsOrg	-0.0141*	0.025	-0.0145*	0.023	-0.0135*	0.036	-0.0138*	0.034
HrsOrgSq	0.0001*	0.074	0.00010*	0.068	0.0001*	0.094	0.0001*	0.089
HrsStudy	0.0074	0.149	0.0079	0.132	0.0072	0.179	0.0075	0.170
HrsStudySq	-0.00003	0.307	-0.00003	0.278	-0.00003	0.372	-0.00003	0.353
HrsWork	0.0018*	0.066	0.0019*	0.062	0.0023*	0.056	0.0023*	0.055
JrSr	0.424**	0.007	0.423**	0.007	0.422**	0.008	0.424**	0.009
NonTrad	-0.031	0.882	-0.032	0.877	-0.107	0.632	-0.108	0.628
OffCampus	0.261*	0.092	0.260	0.096	0.218	0.169	0.218	0.172
Rural	-0.013	0.910	-0.011	0.922	-0.038	0.743	-0.037	0.750
Female	0.264*	0.025	0.140	0.600	0.214*	0.088	0.126	0.642
StressF			-0.013	0.780			-0.013	0.787
Fem_StressF			0.031	0.610			0.023	0.715
StressNF					-0.097	0.216	-0.095	0.234
StressNFSq					0.005	0.128	0.005	0.140
1/2to2HrsHome	-0.087	0.655	-0.091	0.643	-0.066	0.753	-0.070	0.741
Over2HrsHome	-0.034	0.861	-0.029	0.880	-0.021	0.917	-0.021	0.917
WorkInCounty	0.007	0.953	0.004	0.977	-0.050	0.703	-0.054	0.689
Adj. R-sq.	0.1971		0.1898		0.1834		0.1750	
A.I.C.	-102.06		-98.38		-95.10		-91.25	
Observations								

<sup>a</sup> Coefficients marked \* are significant at the 10% level and those with \*\* at the 1% level



There is no clear pattern in which independent variables significantly influence all three types of student spending, but this is not surprising—the constraints, opportunities and motivations faced by college students for recreational spending are quite different than those for store spending so we would expect to find the statistical significance of individual variables fluctuating across the three spending equations. There is one time allocation variable (**HrsStudy**) and one consumer background variable (**Rural**) that is significant in both the total spending and recreational spending equations.

## The Impact of Stress

Table 5 also makes it easy to see that only recreation spending is affected by any of the stress variables, and it is affected by all four (see our earlier discussion of recreation spending). Earlier we noted, based partly on earlier research, that stress may very well be endogenous—changes in stress levels not only cause but are also caused by changes in spending. Hausman tests revealed that there is indeed some degree of endogeneity. There did not seem to be evidence of stress being endogenous when the four stress variables in the regressions were examined one at a time. When financial stress and nonfinancial stress variables were paired up by type (**StressF** with **Fem\_StressF** and **StressNF** with **StressNFSQ**) or considered all together, however, evidence of endogeneity appeared. All three of these combinations of stress variables were endogenous with total

spending and with store spending, while only the nonfinancial stress pair was endogenous with recreation spending.

As a result of our finding of endogeneity, we used 2SLS to re-estimate the regression equations with a full set of instrumental variables to control for the endogeneity among the stress variables and student spending. We do not report the full results of the 2SLS regressions here (they are available on request from the authors), but instead will briefly highlight differences between the OLS and 2SLS results.

Generally speaking, for the regressions using total or store spending as the dependent variable, changes in coefficients and statistical significance were modest. A larger impact was seen, however, in models for the recreation spending dependent variable. Recall that this type of spending was the only one for which all four stress variables were statistically significant in the OLS approach, and that only the pairing of the nonfinancial stress variables was found to be endogenous with spending. When the two nonfinancial stress variables were treated as endogenous in the 2SLS regression, only **Fem\_StressF** remained significant, and the variables **GPArSq**, **HrsStudy**, and **HrsStudySq**, which were significant in the OLS version, became insignificant in the 2SLS versions.

We are somewhat skeptical of the 2SLS results, primarily because we believe the instrumental variables estimated as part of the 2SLS process are less than ideal. The endogeneity we found could have come from measurement error in the stress variables, causing a downward (in absolute value) bias in the estimated coefficients. As a result, we believe that the OLS results provide the best evidence of the determinants of student spending for our sample.

## SOME CONCLUSIONS

This analysis of the spending habits of a stratified random sample of Central Michigan University students indicates that several factors contribute to spending decisions and different types of spending depend on different sets of determinants. Total spending on gasoline, recreation, telecommunications, and in stores is positively related to the frequency of visits to bars, the extent of the student's father's education, the number of hours spent studying, the number of hours worked, being a junior or senior, and living off campus; it is negatively related to the extent of the student's mother's education, the student coming from a rural area, and having a permanent home more than a one-half hour drive from campus. We also find that recreation spending by itself depends positively on the frequency of bar visits, the number of hours spent studying, and the level of financial stress experienced by the student; such spending is negatively related to a student coming from a rural background and the level of nonfinancial stress. We also found that the (positive) impact of financial stress on recreation spending is lower for females. Finally, spending in stores increases with the number of hours worked and if a student is a junior or senior, and decreases with the number of hours spent working in student organizations (except for those with high numbers of student organization hours).

Dep. Var.:	SpendTotal	SpendRec	SpendStore
BarVisits	+	+	0+
EdFather	+	0+	0+
EdMother	-	0+	0--
ExpY	0+	0+	0--
GPAr	0+	0+	0+
GPArSq	--	--	0--
HrsOrg	0--	0--	--
HrsOrgSq	0+	0+	+
HrsStudy	+	+	0+
HrsStudySq	--	--	0--
HrsWork	+	0+	+
JrSr	+	0+	+
NonTrad	0+	0+	0--
OffCampus	+	0+	0+
Rural	--	--	0--
Female	0+	0+	+
StressF	0+	+	0--
Fem_StressF	0--	--	0+
StressNF	0--	--	0--
StressNFSq	0+	+	0+
1/2to2HrsHome	--	0--	0--
Over2HrsHome	--	0--	0--
WorkInCounty	0--	0--	0--
Adj. R-sq.	0.4187	0.2744	0.1750
A.I.C.	-209.10	-154.28	-91.25
* Note: + and -- indicate positive or negative coefficients that are statistically significant at the .10 level 0+ and 0-- are not significant at .10 but have the sign shown			

Businesses whose revenue sources are primarily student spending may find these results useful in thinking about an appropriate strategy for marketing to college students. This implication is somewhat limited, however, since our sample, though properly drawn for CMU's overall student population, is nevertheless taken solely from a single university. Our results most likely apply to a limited group—students at relatively large regional public institutions in the Midwest, located in a smaller town or city, whose students are primarily from within the state—and probably cannot be generalized to larger cities or much smaller or much larger institutions.

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## ENDNOTES

1. In the context of this situation,  $N = 3$ ; we arbitrarily assign  $i = 1$  to purchases made in the university community by the student,  $i = 2$  to purchases made in the hometown for the student's use in the college residence, and  $i = 3$  to purchases made for family members other than the student, regardless of where the purchases are made. There are 15 students in our sample (see discussion below) who live at home with parents; for such students, the hometown considered in  $Z_2$  is the university community.
2. The full set of survey questions is available from the authors on request.
3. For on campus students we assumed communication services were zero. The only such service an on-campus student might incur would be for a local cell phone. Our experience indicates most students obtain cell phone services from a company around their home town.

4. A principal component analysis of this composite nonfinancial stress variable indicates that it is reasonable to sum the three types of nonfinancial stress into the single variable. The results of the principle component analysis are available from the authors on request.
5. The course designator indicates the department in which the course is housed. For example, the designator for economics courses is ECO. The weights referred to are the portions of upper and lower division courses required or commonly taken by students in the major.
6. The 2SLS results are discussed in the section concerning the impact of stress, because the 2SLS models were motivated by apparent endogeneity between the stress variables and the dependent (spending) variables.
7. The inclusion of squared versions of variables often leads to multicollinearity between the squared and linear versions. This instance is no exception, but the results overall do not indicate that the multicollinearity is a serious problem. Two other variables with a relatively high ( $>0.7$ ) correlation are **JrSr** and **OffCampus**; again, there seem to be no problems as a result.
8. An obvious example is a night in a bar, but as the authors and many other former college students can attest, such stress relief tends to be rather temporary.



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# VIRTUAL ENTREPRENEURSHIP: AN EMERGING TOOL FOR SMALL BUSINESS INFORMATION AND DEVELOPMENT

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## INTRODUCTION

The increased interest in entrepreneurship in universities has been seen in both curricula and initiatives to provide information and assistance to small business. Efforts have been made by education and government to encourage entrepreneurship development, since it is recognized that small businesses may lack the expertise and skills for success. For example, government-sponsored programs, such as the Small Business Development Center (SBDC) and Small Business Institutes (SBI) housed within colleges and universities, were developed to assist the small business sector. Higher education brings a unique format to the delivery of entrepreneurial development. Within the last few years, entrepreneurial centers have emerged with different venues of assistance.

Although much research has been conducted regarding success factors, this study examines specific sources of information at entrepreneurial centers. This paper explores the nature of entrepreneurial centers and methods related to rural development in a virtual environment. This research is presented as a descriptive paper in order to determine how virtual entrepreneurship centers assist rural entrepreneurs. Three virtual entrepreneurial centers are investigated with particular attention to their structures, strategies, and impact on those organizations in the rural areas. This paper also examines the options associated with improving the gathering of information to enhance the structure, resources, and decision making of rural entrepreneurs.

The first section is an overview of the background of entrepreneurial centers, networks, and virtual entrepreneurship centers. Secondly, illustrations of effective entrepreneurial centers are discussed. Finally, implications for rural development in a virtual entrepreneurship center are explored.

## LITERATURE SURVEY

This section is segmented into three parts: (1) Entrepreneurship Centers; (2) Rural Entrepreneurship; and (3) Rural Virtual Centers and Networks.

### Entrepreneurship Centers

Entrepreneurship centers help to enhance universities' budgets through donations, endowments, external programming, grants, academic programming, and commercialization of technology. According to Finkle, Kuratko, and Goldsby (2006), 146 centers exist in the U.S. These centers are divided into two groups: (1)

the top ranking centers (the ones who receive more resources and personnel) and (2) the lower ranking ones.

Upton (1997) developed a best practices list for those centers, which include: Starting, directing, funding, managing, and marketing each center.

### Rural Entrepreneurship

Considerable attention has focused on rural entrepreneurship due to changes in rural society. The restructuring of agriculture and the loss of manufacturing firms have caused continuous displacement of workers and increased the need of non farm income to support farming operations. Therefore, many families are unable to leave the rural communities and face a need to find alternative sources of income within the community. Thus, the encouragement of new ventures is viewed as an alternative to increasing income and, thereby, sustaining the stability and growth of rural communities (Wortman, 1990).

Wortman (1990) defined *Rural Entrepreneurship* as: "... the creation of a new organization that introduces a new product, serves or creates a new market, or utilizes a new technology in a rural environment." In addition, Sauer (1986) identified several problems rural entrepreneurs face: (1) lack of farm-related enterprises encouragement; (2) technical and management assistance; (3) impact of federal policies; (4) rural transportation; (5) rural telephone service and information services; (6) rural financial assistance; (7) rural incubators; and (8) family management in rural areas.

Current conditions dictate that a rural entrepreneur must develop a means to achieve a competitive advantage, and, therefore, information becomes a critical variable in strengthening their position in the marketplace (Van Horn & Harvey, 1998). In fact, technology advancements and computing, in general, have disrupted existing markets and industries. Not only are these technologies creating new markets and new product possibilities, but they are also changing the methods in which firms are able to emerge, organize, and compete (Fawler, Lawrence, & Morse, 2004).

### Rural Virtual Centers and Networks

Location influences the formation of new firms and their subsequent performance (Cooper & Folta, 2000). They also argue that it is very difficult for rural firms to find sources of information, skilled labor, technology, and capital all of which agglomerate in urban areas. Furthermore, it is even more

difficult to build networks to overcome these shortages (Acs & Malecki, 2000; Malecki, 1997). The level of innovativeness and competitiveness of firms in rural areas, or any area, depends not only on the degree to which firms are tied to local networks of suppliers, but also to external markets (Acs & Malecki, 2000; Marchesnay & Julien, 1990).

Two aggregate characteristics of information technology that affect the likelihood of survival of new ventures are important. The first represents an important change in the ways that firms are able to connect to their environments (the development of fast, efficient, and low-cost information networks). The second is related to internal resources (the shift to knowledge-based assets) that has changed the basis of competition in many industries (Bettis & Hitt, 1995; Fowler et al., 2004).

Incubators have often served as catalysts and accelerators of entrepreneurial growth, helping entrepreneurs to connect to their environments. Carayannis and Zedtwitz (2005) identified five incubator archetypes: (1) the university incubator; (2) the independent commercial incubator; (3) the regional business incubator; (4) the company internal incubator; and (5) the virtual incubator. They defined a type of network of real and virtual incubators called "GloCal" that would link entrepreneurs with local, regional, and global networks of customers, suppliers, and others. This type of network would help rural entrepreneurs leverage the diverse divides (digital, knowledge, cultural, socio-political, and others) (Carayannis & Zedtwitz, 2005).

## Virtual Rural Entrepreneurship Centers

Locating and accessing solid human and financial capital is a major obstacle that rural entrepreneurs must overcome. Entrepreneurs in rural settings face even greater difficulty because of their isolation from urban centers which often are the site of business resources.

Virtual networks, such as the Texas Center for Rural Entrepreneurship (<http://www.tcre.org>), are enabling rural growth-seeking small businesses and start-up entrepreneurs to access resources that in the past would have been vastly more difficult to reach. Essentially, these networks can facilitate growth by serving as a bridge between entrepreneurs and the people and resources that can make their visions reality. On one hand, The Texas Center for Rural Entrepreneurship offers a tool to share ideas and activities to support local rural entrepreneurs. This type of resources is a valuable tool for the rural entrepreneur who has no access to the same resources as his/her urban counterpart while the focus of the center is to provide local and regional resources only. On the other hand entrepreneurship centers, such as the MIT Entrepreneurship Center (<http://entrepreneurship.mit.edu/index.php>) provide content, context, and contacts that enable entrepreneurs to design and launch successful new ventures based on innovative technologies on a global arena. The center helps MIT students, alumni, and colleagues access an array of educational programs, networking opportunities, technologies, and resources, both at MIT and around the world. Members of the MIT E-Center community form a global network to actively advise and assist each other for mutual benefit, enabling them to set and meet their highest

expectations. Additional resources available for this virtual center include: Online resources center around useful links in all areas of the entrepreneurship process (research, planning, marketing, compensation, funding, etc.). Also, information on building business plans and funding opportunities are listed. The technology, global, and networking emphasis of this center offers a very valuable resource to rural entrepreneurs.

Other centers such as the Florida Virtual Entrepreneurship Center (<http://www.flvec.com/>) provide a system of links county by county. This virtual network directs entrepreneurs to local and county information such as economic data, local, regional, state, and global resources for starting, relocating, and expanding the entrepreneur business. This portal is sponsored by Marion County where entrepreneurs register in order to get access to online resources.

## IMPLICATIONS

This study provides an illustration of university-based entrepreneurship centers, housed in colleges and universities, and government-sponsored entrepreneurship centers which provide a valuable source of information to small businesses. It is important that these programs and services for the small business sector have accessible information. These programs are especially important for rural entrepreneurs who may be unable to actually travel to a physical center. In addition, efforts should be made by program developers to inform small businesses where to contact information specialists who have access to entrepreneurial development.

Further, the results have implications for information specialists and agency providers. Many university and government sources, such as the U.S. Department of Commerce and U.S. Small Business Administration (SBA), have access to databases, such as census data. The virtual entrepreneurship centers provide an effective vehicle for distributing the information with an Internet-accessible database and website information. Institutions of higher education have an important role to play as providers of information and assistance to rural entrepreneurs. A streamlined response process coupled with a single point of contact with small businesses would allow the opportunity to serve a larger number of rural entrepreneurs. A virtual entrepreneurship program should enhance the quality of communications and emphasize and clarify the availability of the services, their purposes, criteria for qualifying, and the benefits that business firms may derive from using the services. Finally, the importance of promoting partnerships with the rural small business community seems necessary in order to increase efforts toward entrepreneur development. Partnerships between academia, industry, local government, and financial bodies should be explored. It seems appropriate that institutions of higher education continue to build bridges and explore methods to assist the small business sector in technology transfer and commercialization.

## LIMITATIONS AND FUTURE RESEARCH

Though our research provides interesting insights into the challenges entrepreneurship development faces into the 21st century, limitations do exist. The research was descriptive in nature without testing a theory. While no research has identified that this area is fundamentally different, other entrepreneurship centers may have additional services that our work did not discover. Additionally, since the research was designed to be exploratory, future research would do well to assess the centers through survey research and a comparison with international entrepreneurial centers.

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# HUMAN FREEDOMS AND SOCIO-ECONOMIC DEVELOPMENT: A CROSS-NATIONAL STUDY

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## INTRODUCTION

Since the time of Adam Smith, if not before, economists have tried to better understand the factors that determine a country's rate of economic growth. This is an important field of study since higher growth rates often translate into greater national output, higher standards of living, and an improved ability to achieve economic and social objectives. The Neoclassical model focused on the importance of increasing exogenous quantities of physical resources (land, labor, and capital) to enhance the rate of growth. More recent research has identified a much larger set of endogenous causal factors of economic growth.

North (1990) has pointed out that institutional factors – the political and economic customs and practices that exist within a country – seem to play a significant role in the long-term performance of an economy. The importance of these factors lies in the fact that all economic decisions are made within a given institutional setting. And while it is difficult to know with certainty how these factors influence economic growth, it is generally assumed that an individual's freedom to choose will advance society at large. Freedom, however, is multifaceted. Economic, political, and religious aspects may be related to one another, but they do not exhibit perfect correspondence. China, for example, has experienced significant advances in economic freedom ahead of political and religious freedoms.

In recent years, empirical evidence consistent with the proposition that economic freedom enhances economic growth has emerged. Barro (1997) found statistical support for the idea that free markets and maintenance of property rights foster economic growth. Farr, Lord and Wolfenbarger (1998) discover a Granger-causal relationship working from economic freedom to economic well-being. Dutz and Hayri (2000) find a high correlation between long-term growth and effective enforcement of antitrust and competition policy. More recently, Baumol (2002) argues that the free-market system acts as a powerful "innovation machine" in societies where the rule of law prevails. Vaga-Gordillo and Alvarez-Arce (2003) also provide convincing evidence that market liberalization fosters economic growth. However, not all the literature is so conclusive. Haan and Sturm (2000) maintain that economic freedom brings countries to their steady state level of economic growth more quickly, but does not increase the rate of steady state growth. Haan and Siermann (1998) suggest that the positive effect of economic freedom on economic growth is not robust, but depends on the indicator of economic freedom used.

The connection between political freedom and economic growth is much more controversial. In *Capitalism and Freedom*, Friedman (1962) suggested that democracy and economic freedom are mutually reinforcing. According to Friedman, democracy should facilitate economic growth through the development of an institutional framework more compatible with incentives to engage in productive transactions. That is, democracy is the political system that allows markets to perform adequately. Social scientists are also aware of the growth-hindering aspects of democracy. Majority voting tends to redistribute income and reduce efficiency. Representative legislatures allow well-organized interest groups to lobby and legally appropriate resources at the expense of society as a whole. Tavares and Wacziarg (2001) find that democracy hinders growth because it reduces investment in physical capital and also because it raises the ratio of public consumption to GDP. In a cross-country empirical study, Barro (1997) observed that democracy has a nonlinear effect on growth. Increases in political rights initially increase growth, which tend to slacken once a certain level of democracy is attained. In their search for causality links, Farr, Lord, and Wolfenbarger (1998) conclude that political freedom does not Granger-cause economic well-being.

With regard to the impact of religious freedom on economic well-being, the evidence is somewhat limited. Alon and Spitzer (2003) examined the effect religious freedom has on various types of country risk. Their findings indicated that religious freedom affects country risk as perceived in product markets, but not as perceived in credit markets. Easterly and Levine (1997) examined the differences in countries with high levels of ethnic diversity (an element of the social environment related to religion) and found that ethnic-group polarization leads to rent-seeking behavior and reduces economic performance. Finally, Alon and Chase (2005) find that religious freedom has a positive effect on a country's per capita GDP.

This study contributes to the literature in two ways. First, all three dimensions of individual freedom – economic, political, and religious - will be examined. Second, the analysis will focus on how freedom impacts a broad measure of human well-being. Previous studies have typically measured economic progress using per capita GDP.

## DATA AND METHODOLOGY

The dependent variable in the study is the Human Development Index (HDI) from the United Nations *Human Development*



Report (2008). The HDI combines three basic dimensions:

- Population health and longevity, as measured by life expectancy at birth,
- Knowledge and education, as measured by the adult literacy rate, and
- Standard of living, as measured by the natural logarithm of per capita gross domestic product adjusted for purchasing power parity.

The HDI takes into account the fact that development is a process of enlarging people’s choices and opportunities for education, health care, and employment. As such, the HDI provides a useful metric to compare standard of living across nations.

The Heritage Foundation provides a reliable index for measuring economic freedom. This index is constructed using 50 independent variables that fall into 10 broad categories: trade policy, fiscal burden of government, government intervention in the economy, monetary policy, capital flows and foreign investment, banking and finance, wages and prices, property rights, regulation, and black market activity. This index therefore broadly reflects the extent to which an economy is pursuing free market principles.

The data on political freedom was drawn from the annual database published by Freedom House. This database actually contains two indices – one reflecting political freedom and the other reflecting civil liberties. Empirical tests indicated a possible multicollinearity problem with the index for civil liberties. The civil liberties index was highly correlated with the religious freedom index. Conceptually, this may be due to overlap in definition and measurement. Two components of civil liberties are free religious institutions and the presence of free private and public religious expression. Conversely, some of the components of religious freedom are in fact subsets of civil liberties. For example, freedom of the press by necessity includes freedom of religious press. As such, the civil liberties measure is omitted from the analysis. When analyzing political freedom, Freedom House focuses on the structural, legal, and procedural conduits of democratic participation in a society. Though they may have certain deficiencies, Poe and Tate (1994) argue that the Freedom House indices remain the best set of comprehensive democracy measures.

The religious freedom measure is taken from the database published in *Religious Freedom in the World: A Global Report on Freedom and Persecution* (Marshall, 2000). Scores are derived from a checklist of items that describe aspects of religious freedom. The measure focuses on the denial of the right to practice one’s religion. Each country was assigned a score on a scale of 1 to 7, 1 signifying a high level of religious freedom, 7 indicating a lack thereof.

In order to determine how much of the cross-country variation in standard of living (as measured by the HDI) can be “explained” by economic, political, and religious freedoms, a linear regression model is used. Multicollinearity that affects the regression analyses was tested using the Variance Inflationary Factor. The values for political and religious

freedoms were inverted for intuitive interpretation of the results so that a coefficient with a positive number denotes a positive relationship between freedom and the dependent variable.

## EMPIRICAL RESULTS

Table 1 shows the correlation matrix for the different variables. There is a strong correlation among all the variables and all correlations are significant at the 1 percent level. The lowest value among the correlations is 0.466 for HDI and religious freedom, and the highest is 0.815 for political freedom and religious freedom. Relationships among the variables have the expected directionality. Higher levels of freedoms are associated with higher levels of standard of living. Economic freedom has the highest correlation with HDI, followed by political freedom, and religious freedom.

Table 2 presents the results for seven alternate model specifications between freedoms and HDI. The F-statistic was significant at the 1 percent confidence level for all regressions, indicating that all models have significant explanatory power.

Models A, B, and C have only one independent variable: economic freedom, political freedom, and religious freedom, respectively. The coefficients have the predicted signs and

	Economic Freedom	Political Freedom	Religious Freedom	HDI
Economic Freedom	1.00	--	--	--
Political Freedom	0.586	1.00	--	--
Religious Freedom	0.641	0.815	1.00	--
HDI	0.667	0.495	0.466	1.00

Model	A	B	C	D	E	F	G
Intercept	-0.054 (-0.753)	0.507*** (15.667)	0.553* (13.128)	-0.022 (-0.302)	0.187** (2.127)	0.553*** (13.307)	0.205** (2.216)
Economic Freedom	0.667*** (10.788)			0.585*** (7.774)	0.550*** (4.745)		0.522*** (4.251)
Political Freedom		0.495*** (6.830)		0.150** (2.00)		0.323** (2.095)	.124 (0.838)
Religious Freedom			0.466*** (4.821)		0.085 (0.733)	0.213 (1.382)	0.008 (0.057)
R <sup>2</sup>	0.445	0.245	0.217	0.466	0.371	0.258	0.381
Adj. R <sup>2</sup>	0.441	0.239	0.207	0.458	0.356	0.240	0.357
F-test	116.38	46.653	23.244	61.962	24.211	14.229	16.382

Notes: The top number is the standardized coefficient and the number in parentheses is the t-statistic. \*Significant at the 0.10 level; \*\*Significant at the 0.05 level; \*\*\*Significant at the 0.01 level.

are statistically significant at the 1 percent level. Model A has the greatest explanatory power with an adjusted R-squared of .441. As such, economic freedom explains 44.1 percent of the variation in HDI.

Model D combines economic freedom and political freedom in explaining HDI. Inclusion of both variables into one model increases the adjusted R-squared to 45.8 percent, suggesting that the two freedom dimensions taken together can better explain the variation in standard of living. Economic freedom was significant at the 1 percent level, and political freedom was significant at the 5 percent level. Both variables have the expected signs.

Model E examines the combined effects of economic freedom and religious freedom on HDI. Although the economic freedom variable remains statistically significant, the adjusted R-squared falls relative to Model A. Similarly, when political freedom is combined with religious freedom in Model F, the political freedom variable is still statistically significant, but the adjusted R-squared remains basically the same. Furthermore, when combined with other measures of freedom, the religious freedom variable is no longer statistically significant as it is in Model C.

Model G incorporates all of the freedom variables. While the economic freedom variable is significant at the 1 percent level, the adjusted R-squared falls to 35.7 percent (10.1 percentage points less than Model D). Neither the political freedom nor the religious freedom variables are statistically significant.

The coefficients reported in Table 2 have been standardized. As such, the size of the coefficients is informative. The coefficient for the economic freedom variable ranged from 0.522 in model G to 0.667 in model A. On average, the coefficient for economic freedom was 0.581, which means that changing economic freedom by one standard deviation would change the HDI by 0.581 standard deviations. The impact of political freedom was much smaller, ranging from 0.495 in model B to 0.124 in model G, with an average of 0.273. The impact of religious freedom was even smaller, with an average of 0.193. Clearly, the influence of economic freedom on standard of living is greater than political and religious freedom.

## CONCLUSION

The empirical results support the hypothesis that increased economic freedom leads to an improvement in the quality of life. The coefficient for the economic freedom variable was always significant and with the appropriate sign. Market liberalization seems to be an appropriate institutional reform for countries whose concerns include the economic well-being of its people. The impact of economic freedom on quality of life trumps that of political and religious freedom. Therefore, the second conclusion is that economic freedom remains one of the most influential variables affecting economic prosperity.

The regression results for the political freedom variable are promising. All of the models using political freedom as an explanatory variable had the predicted sign in the coefficient,

and three of the four using the political freedom variable exhibited significant results. These results suggest that it is in a nation's long-run economic interest to expand not only economic freedom but also political freedom.

The impact of religious freedom on quality of life is much less clear. Only one of the models using religious freedom as an explanatory variable produced significant results. This does not suggest, however, that policy makers should ignore religious freedom as it relates to a country's prosperity. History has shown that religious freedom goes hand-in-hand with other types of freedom, including economic freedom. Furthermore, religious freedom affects the general business environment, political relationships among countries, and consumer sentiment of companies doing business in countries that suppress religious freedom.

The key lesson that emerges from this study is that no single reform by itself is sufficient for improving the standard of living in a nation. A certain degree of freedom in economic, political, and religious areas is necessary to enhance economic well-being. As such, policies that are developed and implemented without considering what F.A. Hayek (1960) called "the constitution of liberty" are likely to yield disappointing results.

This topic has much potential for future research. The measures of freedom are fairly narrow and need to be developed further. Some aspects of economic and political freedom are more crucial for socio-economic development than others, and they need to be identified. Researchers can also develop a more wide-ranging measure of socio-economic development than the HDI and come up with either a composite measure or a set of measures that include all aspects of economic growth, such as income distribution, environmental well-being, and marginalization of countries. But these are all tasks for the future.

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# LIFE EXPECTANCY, HEALTH CARE, AND ECONOMICS

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## INTRODUCTION

In this paper I study life expectancy in the United States relative to other member countries in the Organization for Economic Cooperation and Development (OECD) as a function of health care spending, available health care resources, and lifestyle variables. I find the United States performs very poorly relative to its peers. While the United States spends more per capita by far than any other member country, it has a lower life expectancy and fewer medical resources than most member countries. As of 2006 the life expectancy of the average United States citizen at birth was 78 years. Japanese citizens had the longest life expectancy of any OECD country at 82 years. Turkey and Hungary were tied for the shortest life expectancy at 73 years. This relatively low life expectancy cannot be blamed on the usual culprits of tobacco and alcohol. The United States consumes less tobacco than any other member country except Canada and less alcohol than most other member countries. Also, alcohol consumption is positively correlated with longevity. America's huge obesity rate and its lack of health care resources relative to other member countries most likely cause the poor health of Americans (figure 1). While the United States spends more per capita by far than any other member country, this strangely does not lead to an abundance of health care resources. The possible effects of government regulation on the health care industry are also discussed.

## LITERATURE REVIEW

The standard assumptions about lifestyle issues are that smoking (CDC, 1991) and obesity (Mora, 2005) significantly shorten lifespan and that moderate drinking (Moore, 1986) is positively correlated with longevity. This cross-sectional country study strongly supports the standard conclusions about obesity. While it finds that smoking is negatively correlated with life span and that alcohol consumption is positively correlated with life span, neither of these correlations is statistically significant.

Previous researchers have come to mixed conclusions about the effect of government intervention in the health care industry. Himmelstein and Woolhandler (1986) believe that a nationalized health care system can increase life expectancy while controlling health care costs. Shortell and Hughes (1988) believe that increased competition in the health care industry would lead to a decreased quality of health care. Ohsfeldt (2003) examined survival rates of cancer patients in developed countries and showed that the United States health care system did significantly out perform other countries for those who could obtain treatment. The theory of government enterprise

(Ahlbrandt 1973), and the theory of economic regulation (Stigler 1971) both suggest that government interference in the health care industry increases cost and does not increase health care quality. Friedman (2001) found that government interference in the health system decreased available health care resources while increasing costs. Santerre, Grubaugh, and Stollar (1991) found no direct effect of government intervention on infant mortality or health care costs, but concluded that government intervention in the economy will negatively impact economic growth which will then negatively impact health care. This study concludes that health care delivery is very inefficient in the United States, but can come to no conclusions as to what causes the inefficiency.

## METHODOLOGY

Multiple regression analysis is used to attempt to fit the available data to the equation  $y_i = \sum m_j x_{ji} + b_i$  by solving for the coefficients,  $m_j$ , and the y-intercept  $b_i$ . For cross-sectional analysis,  $y_i$  is the life expectancy in country  $i$ , and  $x_i$  is a data point in one of the OECD countries  $i$  from one of the proxies I wish to examine. When only one independent variable is tested using the equation  $y_i = mx_i + b_i$ , the method is called simple regression analysis. One of the requirements for multiple regression analysis to be valid is that all of the "independent" variables,  $x_i$ , be statistically independent of each other. When this is not the case the problem is called multicollinearity. Multicollinearity is a complication in the analysis I have attempted. I also performed time series analysis where  $y_i$  is the life expectancy in year  $i$  in the United States, and  $x_i$  is one of the independent variables in the United States in year  $i$ .

Regression analyses yields not only the best fit values for  $m_j$  and  $b_i$ , but also an indication of how good the data fit is which is reflected in the t-statistics,  $t$ , and the coefficients of determination,  $R^2$ . The t-statistic is equal to the slope,  $m$ , divided by the standard error of the slope and indicates how significant the  $x$  values are in predicting the  $y$  value. T-statistics greater than 2.6 are considered significant at the 1% confidence level, and t-statistics greater than 1.96 are considered significant at the 5% confidence level for large samples. The  $R^2$  value is the fraction of the variation of the  $y$  value that is explained by the  $x$  values; an  $R^2 = 1$  indicates an exact fit, an  $R^2 = 0$  indicates no fit. For a discussion of regression analysis see Goldberger (1991).

## EMPIRICAL RESULTS

### STATISTICAL RESULTS FROM REGRESSION ANALYSIS

(t-statistics are in parenthesis)

Cross Sectional Analysis

Single Regression Analysis

Life Expectancy (in years) vs

Table 1	Y - Intercept (t-stat)	Slope (t-stat)	Observations	R <sup>2</sup>
Total Health Care Spending	74.37 (71.78)	0.001664 (3.75)	29	0.3423
Physicians per Capita	75.29 (40.15)	0.9109 (1.46)	29	0.0727
Nurses per Capita	74.57 (63.65)	0.4173 (3.09)	29	0.2612
Acute Care Beds	77.18 (53.50)	0.1395 (0.44)	28	0.0074
MRI Units	76.33 (114.86)	0.2177 (3.04)	28	0.2622
CT Scanners	76.56 (111.75)	0.0724 (2.43)	29	0.1832
% Public	75.65 (24.05)	0.02982 (0.70)	29	0.0176
% Pharmaceutical	82.20 (65.24)	-0.2471 (-3.70)	30	0.3278
Tobacco Consumption	80.72 (28.74)	-0.1037 (-1.01)	29	0.0366
Alcohol	76.15 (44.87)	0.1846 (1.10)	29	0.0426
Obesity	79.68 (67.48)	-0.1266 (-1.64)	29	0.0906

Multiple Regression Analysis

Life Expectancy (in years) vs.

Table 2	Coefficient (t-stat)	Observations	R <sup>2</sup>
Y - Intercept	77.63 (16.08)	28	0.4771
Total Health Care Spending	0.001516 (3.18)		
% Public	0.006536 (0.18)		
Tobacco Consumption	-0.0851 (-0.89)		
Alcohol	0.1037 (0.07)		
Obesity	-0.1506 (-2.10)		

I regressed life expectancy (tables 1 and 2) against a variety of variables available for the member countries in the *OECD Health Data*. I also regressed many of the variables against each other to check for multicollinearity problems. As can be seen in table 3, t-statistics of many of the “independent variables” are strongly significant, making multiple regression analysis complicated.

As can be seen in table 1, life expectancy is positively correlated with per capita health care spending (figure 2) and the availability of health care resources (figure 3). The most statistically significant health care resources are per capita nursing staff, MRI units, and CT scanners. The lack of health care resources in the United States relative to other OECD countries likely contributes to America’s low life expectancy relative to its peers (figure 1). Life expectancy is positively correlated with the percent of health care spending that comes from the public sector, but this correlation is not statistically significant. Life expectancy is negatively correlated with the percent of health care spending that goes to pharmaceuticals indicating that expenditures on this method of treatment may be less efficient than other treatment methods. Life expectancy is negatively correlated with per capita tobacco consumption and positively correlated with per capita alcohol consumption, but neither of these relationships is statistically significant. Life expectancy is negatively correlated with the obesity rate and this relationship is of borderline statistical significance (figure 4). Since the United States has by far the largest obesity rate among the OECD countries, it is likely that America’s weight problem contributes to its low life expectancy relative to its peers. The usefulness of obesity data is somewhat limited since obesity is measured differently in different countries.

Table 2 shows the result of a multiple regression analysis using variables that are reasonably independent. Table 5 shows that many of the “independent” variables are correlated with each other. Since health care spending is correlated with most health care resources, it is used as a proxy for those resources. The two variables that are shown to be of statistical significance are per capita health care spending and obesity. The United States spends more on health care per capita than any other country in the world and also has a higher obesity rate. Strangely in the United States this huge health care spending does not translate to a great abundance of health care resources.

### Cross t-statistics for “independent” variables

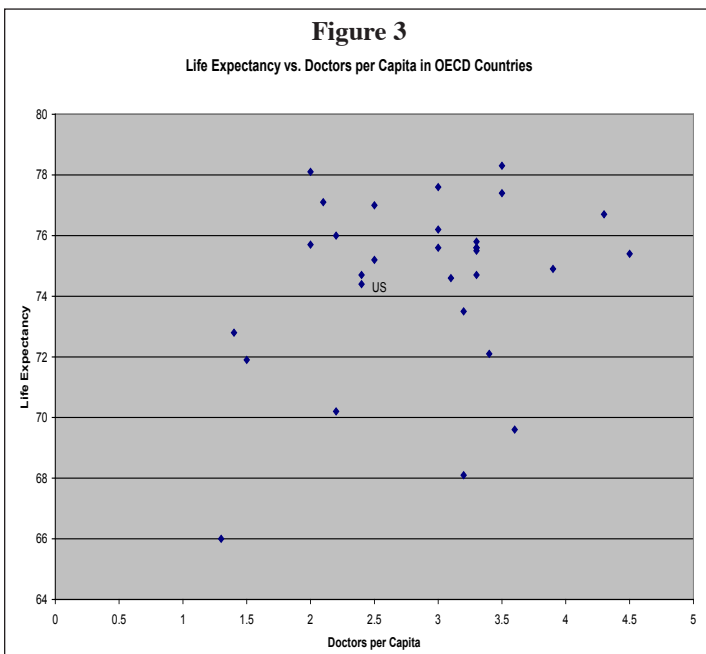
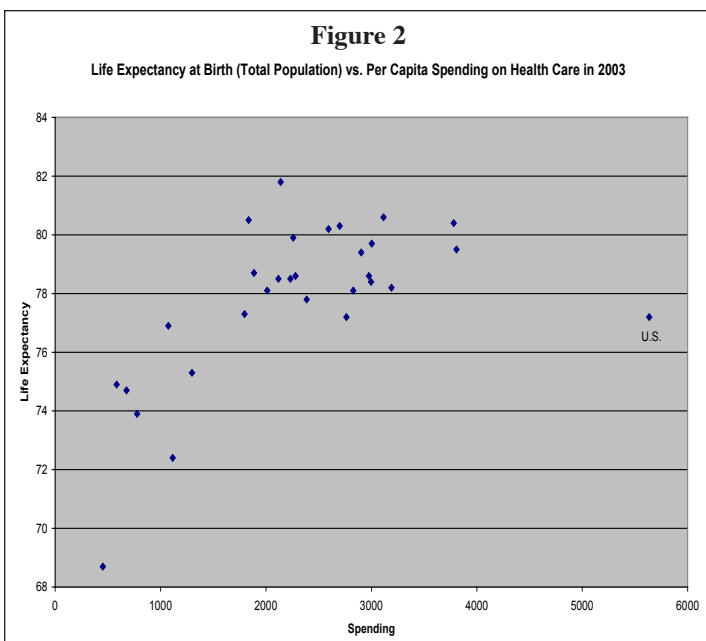
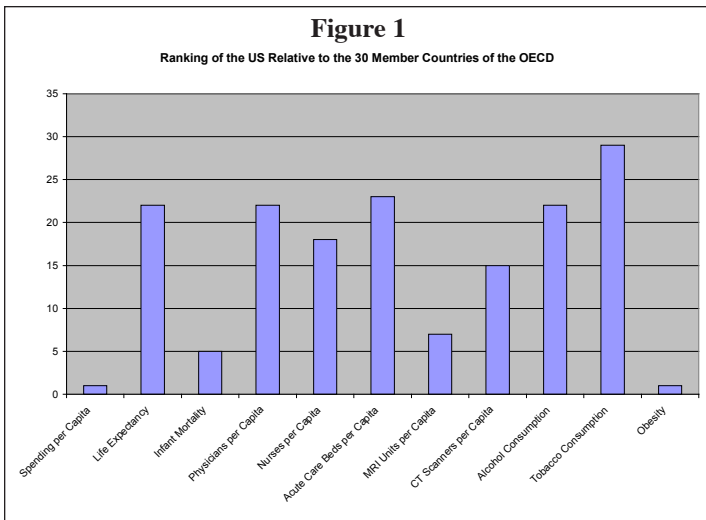
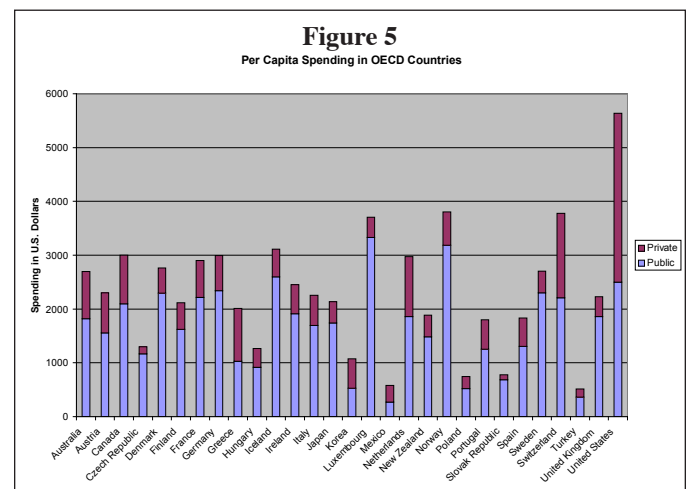
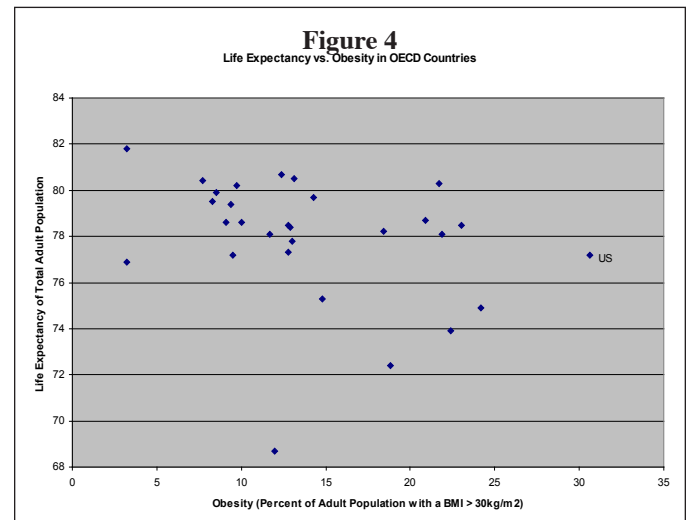
Table 3	Physicians	Nurses	Acute Care Beds	MRIs	CTs	%Public	%Pharm	Tobacco	Alcohol	Obesity
Spending	1.10	3.46	-0.13	1.54	0.82	-0.20	-6.09	-1.67	1.59	0.35
Physicians		0.99	0.65	-0.07	-0.44	2.09	-0.72	0.16	2.18	-0.42
Nurses			0.64	1.11	0.36	2.03	-4.95	-0.80	1.41	-0.13
Acute Care Beds				2.69	4.00	2.27	1.16	1.75	1.70	-1.33
MRIs					9.81	0.64	-1.27	0.86	-0.70	-2.69
CTs						0.73	-0.48	1.26	-0.16	-2.40
%Public							0.18	-0.21	1.32	-0.87
%Pharm								0.67	-0.66	0.13
Tobacco									0.72	-1.94
Alcohol										-0.12



## CONCLUSION AND DISCUSSION

In this paper I studied life expectancy in the United States relative to the other member countries in the Organization for Economic Cooperation and Development (OECD). I found that the United States performs very poorly relative to its peers. While the United States spends more per capita by far than any other member country, it has a lower life expectancy than most other member countries. This low life expectancy is probably caused by the United States' lack of health care resources relative to other member countries and its high obesity rate.

In general increased health care spending leads to increased availability of health care resources (per capita numbers of doctors, nurses, MRI units etc.) but this does not seem to be the case in the United States. The United States has fewer medical resources than most of the of the 30 member countries of the OECD. In life expectancy at birth, the United States is ranked 21<sup>st</sup> out of the 30 member countries of the OECD. In per capita number of physicians the U.S. is ranked 23<sup>rd</sup>, in per capita number of nurses it is ranked 18<sup>th</sup>, and in per capita number of acute care beds the United States is ranked 23<sup>rd</sup>. The data on CT scanners and MRI units is not as useful due to inconsistent statistics between countries, but the U.S. is ranked 15<sup>th</sup> in per capita number of CT scanners and 7<sup>th</sup> in per capita number of MRI units (figure 1).



A possible cause of this inefficiency is the United States' multiple barriers to entry such as Certificate of Need programs (Certificate 2005)(Fitzgerald 2004), efforts by the U.S. pharmaceutical industry to limit competition (Dolinski 2004), and efforts by the American Medical Association to limit physician numbers to keep salaries high (Allen 1997)(Cauchon 2005), but a detailed analysis of this topic is beyond the scope of this paper. While life expectancy is positively correlated with the percent of health care spending that comes from the public sector this correlation is not statistically significant, so this paper can make no assertions regarding government run versus private health care systems.

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