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## Economic and Legislative Effects on Performance Based Funding and Licensed Practical Nursing Programs

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ECONOMIC AND LEGISLATIVE EFFECTS ON PERFORMANCE BASED  
FUNDING AND LICENSED PRACTICAL NURSING PROGRAMS

by

ANDREW C. PAPA

A thesis submitted in partial fulfillment of the requirements  
for the Honors in the Major Program in Legal Studies  
in the College of Health and Public Affairs  
and in The Burnett Honors College  
at the University of Central Florida  
Orlando, Florida

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Thesis Chair: Dr. Abby Milon

## **ABSTRACT**

The purpose of this research paper is to evaluate different elements of the State University System of Florida. Specifically, this paper will analyze how universities will respond when appropriated 20 million dollars of performance based funding and will also evaluate how efficient the 2009 changes in Florida's § 464 were. This paper will use comparative statics and a duopoly model in order to explain behavior of universities when they are appropriated performance based funding. Moreover, this paper will use measures of central tendencies and hypothesis testing in order to statistically analyze data of Florida's Licensed practical nursing programs provided in the 2013 OPPAGA Nursing education report. When all is said and done the findings in this paper could suggest statutory reform of Florida's § 464.

## **DEDICATION**

I would like to dedicate this paper to a quote by Les Brown, which has profoundly inspired me to write this paper.

“The graveyard is the richest place on earth, because it is here that you will find all the hopes and dreams that were never fulfilled, the books that were never written, the songs that were never sung, the inventions that were never shared, the cures that were never discovered, all because someone was too afraid to take that first step, keep with the problem, or determined to carry out their dream.”

## **Acknowledgements**

First and foremost, I would like to thank my committee for all the support they have provided me in writing this thesis paper. I would especially like to thank my committee chair, Dr. Milon for seeing me through this process from the beginning to the end. Finally I would like to thank my mentor, Dr. Cook for helping me shape my future and supporting my progression through my undergraduate studies.

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## **Introductory Scope**

This paper will provide a framework for the university system and analyze that framework from an efficiency viewpoint, in regards to performance based funding.<sup>1</sup> I will describe how the State University System regulates universities through Florida Statutes and discuss why Florida legislation would enact such laws. All of this will be done from an efficiency perspective. Although, I will discuss behavior of students within the school system, this paper is not meant to disprove or prove certain types of behavior of students but to use them as assumptions in developing a framework.

The general background information is intended to provide the reader with insight regarding the university system and how it is operated today. If the reader is up to date on the State University System the reader should proceed to Literature Review section of the paper. I have described how society has changed in the past decade and how it has affected students and the educational institutions. Given all this information I will create an economic model of a university duopoly in order to analyze how universities interact with each other given performance based funding, using certain assumptions. My economic model will answer the following:

- How will increasing a performance based score of a university affect its budget?
- How will increasing the score of a duopoly opponent affect a university's budget?
- How will the cost of a university affect their budget?
- How do budget maximizing universities behave?

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<sup>1</sup> The mean of "efficiency" for this paper will be to maximize social welfare.

The economic model is meant to analyze behavioral affects given certain characteristic changes in the market. The economic model is meant to reveal very general behaviors of the universities rather than tailoring each function to each university's exact score and cost, thus the economic model could be applied to other performance based funding appropriations scenarios. Ultimately, the economic model will answer how universities will behave in order to maximize their budget.

Finally, I will discuss the efficiency of nursing educational programs in the state of Florida pursuant to chapter 464 of the Florida Statutes. My research will answer the following:

- Are the new nursing programs' passing rates different than the nursing programs created before procedural changes in 2009?
- Are the new nursing programs created since 2009 below or above the national average?
- What are the spreads or standard deviations of passing rates of each group of nursing programs?
- What are the spreads or standard deviations of the enrollments of new and old nursing programs?<sup>2</sup>
- Are there more non-passing students in the new nursing programs than passing students?

This paper is not meant to determine whether or not the statute achieved its intended purpose, to increase the supply of nurses in the state of Florida, but to analyze how efficient the statute was in achieving this goal.<sup>3</sup> Furthermore, I will only be analyzing the data sets of licensed

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<sup>2</sup> New nursing programs are programs created since 2009 and old nursing programs are nursing programs created before 2009.

<sup>3</sup> (Office of Program Anaysis & Government Accountability , 2014)

practical nursing programs because these programs have low barriers to entry and believe it will reflect the behavior of a free market. This paper will not analyze other programs such as registered nursing programs due to lack of data. The new program policy has not been out long enough to accurately evaluate the effect on nursing programs of higher caliber. These higher caliber programs require greater infrastructure, resources, and time to create a viable program.

## **General Background Information**

### **State University Systems**

The State University System of Florida had an economic impact of nearly \$80 billion in 2009-2010, which includes both direct and indirect spending<sup>4</sup>. This system encompasses the entire State of Florida and is an instrumental part of Florida's economy. Not only does it directly employ individuals, it also educates students in order to raise the human capital of our society.<sup>5</sup> The impact of the State University System's employment translates into 7.89 percent of the total state's workforce in 2010, which is equivalent to 9,773,730 job positions.<sup>6</sup>

As the demand for a college education rises, so does the associated cost for an education according to tuition rates tracked over time. Over the past 30 years the average published tuition and fees at private four-year institutions rose by 153 percent across the United States, while the increase of in-state student tuition and fees at four-year institutions was 231 percent.<sup>7</sup> The demand for higher education is reflected in the full time enrollment rate, which is also known as the FTE. The FTE in public, four-year and two-year colleges grew 15 percent from 1982-1992 and by another 15 percent from 1993-2003 while the estimated growth in enrollment over the past decade was 19 percent.<sup>8</sup>

The Board of Governors is empowered by legislative branch via statutes and is considered an executive branch in Florida's government. The Board of Governors is considered a "public officer" and must "exercise its authority in a manner that supports, promotes, and

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<sup>4</sup> (Frank T. Brogan, 2012)

<sup>5</sup> Human Capital – are skills individuals acquire that increase their self-worth thus, making them more proficient

<sup>6</sup> (Frank T. Brogan, 2012)

<sup>7</sup> (College Board, 2013) The percentage change on tuition and fees accounts for inflation.

<sup>8</sup> (College Board, 2013) FTE – Full time Employment Rate

enhances a K-20 education system that provides affordable access to postsecondary educational opportunities for residents of the state.”<sup>9</sup> The Florida Statutes not only enumerate numerous duties of the Florida Board of Governors but it also enumerates duties of the Florida Legislature in order to abide by the state constitution’s separation of powers.<sup>10</sup>

**Table 1 Duties of the State Legislature and Board of Governors**

<b>Duties of Legislature</b>	<b>Duties of the Board of Governors</b>
[c] Establishing tuition and Fees	[i] Governing admissions to state universities
[d] Establishing policies related to merit and need based student financial aid	[e] avoiding wasteful duplication of facilities or programs within the State University System

The duties listed above in Table 1 will be used as criteria in my research in developing an economic model of the State University System of Florida. Analyzing the adjustments by the State University System over time and how it has grown in order to accommodate higher demand is quite intriguing. For instance, the University of Central Florida had the lowest student enrollment rate of all the state universities in 1996 but then surpassed all other Florida universities in 2009. After several years of growth UCF now has over 59,000 students enrolled and is the second largest in the nation.<sup>11</sup> Although UCF has experienced an augmentation in the qualifications of its freshman class, some economists believe that standards of the universities have fallen. Increased market pressure in tandem with statutory obligations to “maximize open access for students” has subsequently empowered students, causing colleges to cater to students’ desire for leisure.<sup>12</sup> Students prefer easier classes and leisure activities more now than ever.

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<sup>9</sup> (§ 1001.70, Fla, Stat., 2014)

<sup>10</sup> (§ 1001.70, Fla, Stat., 2014)

<sup>11</sup> (Ehasz, 2014)

<sup>12</sup> (Babcock, 2011) (§ 1001.60, Fla, Stat., 2014)

Universities know that students seek an entertaining environment in which to spend their time and money; therefore universities respond by relatively increasing spending on non-academic and recreation facilities in comparison to academic instruction.<sup>13</sup> If a university has a greater percent change in their leisure activities budget in comparison to their academic instruction budget, that university has relatively increased spending in their leisure activities. For instance, a university can relatively increase spending on leisure activities by purchasing student concerts, movie nights, and student transportation to local bars and clubs; amenities that seem inessential for a student to receive an education but play an instrumental role in gaining school popularity and accommodating students' propensity for pleasurable activities. Universities try to market these amenities to future students with brochures depicting students having fun and recruitment packages with free "Frisbees and chocolate chip cookies", which ultimately portrays a university as a "vacation spa" or a resort.<sup>14</sup>

### *Culture*

Students are pressured by parents and economic standards into obtaining a college education more now than in the past. In 2010, only 36.5 percent of adults in Florida had college degrees. The Lumina Foundation however projects that by 2018, 59 percent of Florida jobs will require a college credential and by 2025, 42.6 percent of adults in Florida will have college degrees.<sup>15</sup> If these predictions are correct the demand for a college education will rise dramatically. Furthermore, providing secondary education to Florida's citizens is a salient goal in achieving economic growth. Pursuant to these axioms and the Florida Statutes, The Board of

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<sup>13</sup> (Babcock, 2011)

<sup>14</sup> (Babcock, 2011)

<sup>15</sup> (Ehasz, 2014)

Governors could define each university's primary "mission" to increase its enrollment in order to satisfy augmenting demand.<sup>16</sup>

Society's mores are evolving with the State University System. Parents are instilling values of educational importance into their children, inundating the children to perform to their maximum potential.<sup>17</sup> The demand shock for education has caused fierce competition between students to augment, thus creating high stress environments. Students describe how they feel pertaining to "growing pressure" in the film *Race to Nowhere*.<sup>18</sup> One student describes the expectations of students and compares those expectations to being a "superhero." Students are expected to get "good grades", get "into the best school", "play at least one sport", "show leadership skills", and also "volunteer."<sup>19</sup> This mindset has evolved into an American culture which is advocated by parents, teachers, and the government. Ultimately, this American culture has changed the way students approach education.

"According to the National Center for Biotechnology Information, at the U.S. National Library of Medicine, the average attention span of a human being has dropped from 12 seconds in 2000 to 8 seconds in 2013."<sup>20</sup> The attention span of a human being in 2013 is actually 1 second less than a goldfish with an attention span of 9 seconds. Students are learning to "tune out" presentations and switch their attention to external stimulations, such as social networking and usage of their cell phones.<sup>21</sup>

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<sup>16</sup> (§ 1001.70, Fla. Stat., 2014) Defining missions of each constituent university is a Constitutional Duty of the Board of Governors

<sup>17</sup> (Fridkis, 2010)

<sup>18</sup> (Banbusy, 2014)

<sup>19</sup> (Banbusy, 2014)

<sup>20</sup> (Brenner, 2014)

<sup>21</sup> (Brenner, 2014)

The college students of this generation believe they can multitask effectively and remain productive. Most students also believe that social networking is an effective means of communication and some students only have interactions with others via internet, going days without actual face to face interactions. A staggering 80 percent of college graduates are expecting to be formally trained by their first employer while employers are cutting training programs for entry level positions.<sup>22</sup> Employers are seeking graduates with practical skills that are acquired in the workplace and thus prioritizing graduates with experience. Students know internships provide an invaluable edge over other job applicants and seek these internships while in college.

The conglomeration of the numerous factors affecting the State University System has caused standards among universities to fall. Although one cannot measure long term learning at the universities, universities do set standards for “academic effort” and some students do not even come close to these standards.<sup>23</sup> Florida universities require students to maintain a 2.0 cumulative GPA or else they will be put on academic probation.<sup>24</sup> Furthermore, the 2.0 standard is one of the few requirements a student would need to meet in order to transfer to a state university from a community college in their third year of study.

### *Standards*

General education courses at the university level are inefficient unless they teach skills students would need in the future such as those pertaining to their major, speaking skills, writing skills, and mathematical skills. The information available on the internet is exponentially

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<sup>22</sup> (Dill, 2014)

<sup>23</sup> (Babcock, 2011)

<sup>24</sup> In order for a student to maintain a 2.0 GPA the student must have a “C” grade average.



augmenting and the content has tripled from 2010 to 2013.<sup>25</sup> It seems redundant to exhaust resources on classes that have no relevance or practical uses in relation to the student's major, when the student could just access the same information via internet.

Students' studying time outside of classrooms at four-year institutions has fallen 10 hours from 1961 to the 2000s transferring their study time to leisure activities.<sup>26</sup> An "entitlement culture"<sup>27</sup> has developed among students and professionalism has declined.<sup>28</sup> Students will text message during classes, send emails with grammar and spelling mistakes, and act "unfocused."<sup>29</sup> In a York College study, 37 percent of the professors believe that attentiveness, work ethic, and punctuality have declined over the past 5 years.<sup>30</sup>

The United States has some of the lowest ranks in proficiency in literacy, numeracy and problem solving skills among developed countries.<sup>31</sup> Despite our 17.1 year schooling average the United States still ranks 9th out of 13th in literacy of industrialized nations, 8th in problem solving and 10th in math.<sup>32</sup> Mary Alice McCarthy, a senior policy analyst at the New American Foundation, said "Young people are moving into adulthood and they do not have the necessary skills" and young people in the United States are not showing much higher level of skill than young people in other developed nations.<sup>33</sup>

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<sup>25</sup> (Brenner, 2014)

<sup>26</sup> (Babcock, 2011)

<sup>27</sup> "Entitlement culture" – Students believe that it's their right to learn at universities and teachers in a sense work for them because they pay tuition.

<sup>28</sup> (Bauerlein, 2013)

<sup>29</sup> (Bauerlein, 2013)

<sup>30</sup> (Bauerlein, 2013)

<sup>31</sup> (Hargreaves, 2013)

<sup>32</sup> (Hargreaves, 2013)

<sup>33</sup> (Hargreaves, 2013)

### *University Priorities*

Universities across the nation provide diversity statements, advocating a diverse student population in order to provide an enriching educational experience. In the landmark case Grutter v. Bollinger, 539 U.S. 306 (2003) the United States Supreme Court ruled that it was not unconstitutional to have a race conscious university admission process in order to favor “underrepresented groups” and a race conscious admissions did not amount to a quota system ruled unconstitutional in Regents of the University of California v. Bakke, 438 U.S. 265 (1978).<sup>34</sup> Florida’s legislation actually stipulated that Florida universities will “continue to provide outreach to underserved populations.”<sup>35</sup> This requirement could be interpreted in multiple ways in regards to financial aid and class diversity. Universities can legally prioritize certain minority groups over disfavored racial groups if students have the same credentials.<sup>36</sup> According to The Census Bureau “Asians” have the highest median household income and “Blacks” have the lowest median household income, thus on average a “Black” and an “Asian” student with similar credentials could receive different amounts of financial aid on top of race prioritization during the admission process.<sup>37</sup> Ultimately, in this particular case the “Black” student would have a greater chance of being selected to attend a university and would also receive greater financial aid due to low family income. Furthermore, in order for both the “Black” and the “Asian” to have the same exact chance of being selected in the admissions process, the “Asian’s” credentials must be higher.

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<sup>34</sup> (Grutter v. Bollinger, 2003) (Regents of the University California v. Bakke, 1977)

<sup>35</sup> (§ 1001.60, Fla. Stat., 2014)

<sup>36</sup> (Grutter v. Bollinger, 2003)

<sup>37</sup> (The Census Bureau, 2012)

### *Student Loans*

Student loans are an instrumental part of the State University System which allow students to forgo future earnings in order to receive an education. Students must fill out The Free Application for Federal Student Aid, also known as FAFSA, form every year to qualify for financial aid. A student must demonstrate a “financial need”, show they are “qualified” to obtain a college or career school education, and maintain “satisfactory progress” along with other supplemental requirements.<sup>38</sup> FAFSA requires each student to disclose pecuniary information regarding their families, which allows the state or federal government to decide who needs and qualifies for aid, which entails price discrimination.

There are two main types of loans available to students, direct subsidized loans and direct unsubsidized loans. The United States Department of Education pays the interest on direct subsidized loans while a student is at least half-time in school, during deferment periods, and during a grace period.<sup>39</sup> Grace periods allow recently graduated students to find a job and secure a steady form of income before they have to start paying their debt. On the other hand direct unsubsidized loans are available to undergraduate and graduate students and there is no need to demonstrate financial need.

Students are responsible for paying interest on their direct unsubsidized loans during “all periods.”<sup>40</sup> Direct unsubsidized loans will accrue interest if not paid, thus becoming quite cumbersome over extended amounts of time. While schools determine how much one can

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<sup>38</sup> (U.S. Department of Education, 2014)

<sup>39</sup> (U.S. Department of Education, 2014)

Deferment periods are postponements of loan payments

Grace periods are the first six months after a student leaves a school.

<sup>40</sup> (U.S. Department of Education, 2014) “All periods” includes periods when currently enrolled at a university.

borrow for both types of loans, direct subsidized loans may not exceed one's financial need and on the other hand direct unsubsidized loans are based on the cost of attendance and other sources of aid.<sup>41</sup> Senator Elizabeth Warren has proposed a piece of legislation in District of Massachusetts that would allow students to take out governmental education loans at the "same rate that big banks pay to borrow from the federal government."<sup>42</sup>

Warren's Student Loans Fairness Act, for one year, would allow students to take out a federal subsidized Stafford Loan at the .75 percent federal funds rate instead of the 3.4 percent student loan rate in 2013.<sup>43</sup> According to Warren, the federal government makes an average of "36 cents" for every dollar it lends to students. Furthermore, university endowments and teachers' pension funds are among the big investors in Sallie Mae, a former government sponsored enterprise which was fully privatized in 2004 and now trades publicly as a SLM Corporation.<sup>44</sup> Nassirian thinks "it's a conflict of interest" because it is "inherently problematic" to benefit from the financing of tuition you charge through investments in any lender situation. Moreover, Sallie Mae's loans are guaranteed profits since borrowers cannot file for bankruptcy in order to avoid payments.

The government can collect on these defaulted loans by garnishing wages, retirement benefits, social security, and life insurance upon death.<sup>45</sup> Regular loans use collateral to guarantee repayment and when one defaults the financial institution will seek to recover from

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<sup>41</sup> Subsidized are ultimately cheaper for students and should be the preferred loan between subsidized and unsubsidized.

<sup>42</sup> (Webley, 2013)

<sup>43</sup> (Webley, 2013)

<sup>44</sup> (Nasiripour, 2013)

<sup>45</sup> (Luzer, 2013)

one's personal assets. Over the long haul, student loans are made to individuals with little or no assets. Financial institutions have little or no incentives to lend money to students because if they default on their loans the financial institutions will not be able to recover their losses. These incentives in essence give Sallie Mae monopoly market power in the student loan market and raises alarms similar to the alarms brought up with the School as a Lender Program.<sup>46</sup> In the School as a Lender Program approved universities were directly lending and profiting from their students, thus creating inherent incentives to raise tuition prices.<sup>47</sup>

### *Nursing Programs*

The 2009 Florida Legislature modified the way the Board of Nursing oversees educational programs with the intent to increase the number of nursing programs and qualified nurses in Florida via chapter 464 of the Florida Statutes.<sup>48</sup> The Board of Nursing consists of 13 members, appointed by the governor and approved by the Senate.<sup>49</sup> The duty levied upon the Board of Nursing was modified pursuant to modifications in chapter 464 of the Florida Statutes in 2009 and again in 2010. "In 2009, the Legislature modified the process for approving new nursing education programs by removing rulemaking authority from the Board of Nursing and specifying the nursing education program approval process statute."<sup>50</sup> Legislature modified the new process again in 2010 in order to address issues raised by the Office of Program Policy Analysis & Government Accountability, also known as OPPAGA.

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<sup>46</sup> (Luzer, 2013)

<sup>47</sup> (Burd, 2006)

<sup>48</sup> (Office of Program Analysis & Government Accountability, 2014)

<sup>49</sup> (§ 464.004, Fla. Stat., 2014)

<sup>50</sup> (Office of Program Analysis & Government Accountability, 2014) Chapter 2009-168, Laws of Florida

The Board of Nursing has approved 231 new nursing educational programs from the onset to January 2014, thus increasing the total number of programs by 139 percent.<sup>51</sup> Although the number of nursing student seats has increased by 180 percent, the licensed practical exam passage rates of the nursing programs created since 2009 have declined.<sup>52</sup> Approximately 73 percent of the new licensed practical programs were more than 10 percent below the national average for the 2013 calendar year.<sup>53</sup> During 2013 the board considered 60 new programs and approved 59 for new nursing programs offered by private institutions licensed by the commission for independent education.<sup>54</sup> Only 10 total programs were not approved by the Board of Nursing since the legislation took effect.

According to the Florida Statutes, an institution must submit a “review fee of \$1,000” for each nursing program to be offered at each of the “institution’s main campus, branch campus, or other instructional site.”<sup>55</sup> The application must also document that 50 percent of the program’s faculty members are registered nurses with at least a “higher degree in a field related to nursing.”<sup>56</sup> The stipulated criteria for an application and approval are quite low and present very low barriers to entry.

The Board of Nursing shall approve the application if the application is “complete” and in compliance with subsection 1 of § 464.019. If the application is incomplete the department shall notify the educational institution for any errors or omissions within “30 days” of receipt.<sup>57</sup>

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<sup>51</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>52</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>53</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>54</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>55</sup> (§ 464.019, Fla. Stat., 2014)

<sup>56</sup> (§ 464.019, Fla. Stat., 2014)

<sup>57</sup> (§ 464.019, Fla. Stat., 2014)

The Board of Nursing shall, in writing, provide the educational institution a notice of intent to deny the application and cannot deny an application for “failure to meet criteria” or “failure to correct errors” when the Board of Nursing fails to notify the applying educational institution within the 30 day notice period.<sup>58</sup>

In order to hold the programs “accountable” an approved program must achieve a graduate passage rate “not more than 10 percentage points lower than the average passing rate during the same calendar year” which is calculated by the National Council of State Boards of Nursing.<sup>59</sup> If a program does not equal or exceed the required passage rate for 2 consecutive years, the board shall place the program on probation and then the program director “shall appear before the board to present a plan for remediation.”<sup>60</sup> In the End, the program will remain on probationary status until the graduates’ passage rate equals or exceeds the national average or it notifies the board with intent for closure.

### ***Market Structure***

The State University System of the State of Florida from an industrial perspective has many similarities to an oligopoly market structure. First, the industry is dominated by a small number of firms, each of which is large compared to the overall size of the market. Second, the firms have identical or differentiated products and finally the industry has significant barriers to entry. These key assumptions will be used later on when deriving the reaction functions of each university.

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<sup>58</sup> (§ 464.019, Fla. Stat., 2014)

<sup>59</sup> (§ 464.019, Fla. Stat., 2014)

<sup>60</sup> (§ 464.019, Fla. Stat., 2014)

The distinct characteristic of the first assumption gives each one of the firms substantial market power within the industry, thus the universities are price makers while the students are price takers. Although universities have a price making prerogative, the state of Florida's government regulates and subsidizes universities in order to provide cheaper tuition rates and "maximize open access for students".<sup>61</sup> The economic reason why these statutes are in place is to stimulate economic growth in Florida and advance research and development. It is logical to create one location where intellectual people could conduct research while simultaneously teaching students in their field of expertise. Furthermore, one can notice that the state universities are spread out through Florida in order to economically stimulate different areas as opposed to being all located in one concentrated area and just stimulating that part of Florida.

The second assumption is crucial to this market structure and will be later used when analyzing interactions between firms. Entry in the State University System is blocked because in order to become a university an institution would have to be approved by the Florida Board of Governors and one cannot simply decide to erect a public institution overnight. Although identical degrees among the different colleges hold different weights in the workplace, the degrees are ultimately similar products and substitutable goods. The pedagogy might differ from university to university but ultimately the goods are still education, therefore the goods are differentiated.

Universities are constantly competing to become the better school or firm. The Florida Board of Governors has set goals for Florida's university system to reach by 2025. The Board of Governors specifies Goals of "Excellence" and "Productivity", promoting academic programs of

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<sup>61</sup> (§ 1001.60, Fla. Stat., 2014)



the “highest quality” and to “increase educational attainment levels of its citizens.”<sup>62</sup> The Board of Governors goes as far to admonish universities, through statutes, stating that universities “must respond by awarding more degrees in specific high demand programs, particularly the STEM disciplines.”<sup>63</sup> In Essence, the universities are competing for a limited amount of state funds that are awarded to universities relative to indicators such as output and quality.<sup>64</sup>

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<sup>62</sup> (Board of Governors, 2011)

<sup>63</sup> (Board of Governors, 2011)

<sup>64</sup> This observation will become a key part of my model within the paper and ultimately will be transformed into a function.

## Literature Review

The consumers of a college education are rational. Individuals will choose to enroll at a university if the expected lifetime income is higher than the expected lifetime income of a worker in the non-academic sector.<sup>65</sup> However, the university system is evolving with a relative increase in leisure activity spending, thus leisure activities must be taken into account when evaluating consumer choices.<sup>66</sup> Hemelt found that a one hundred dollar increase in tuition would lead to a 0.25 percent decrease in student enrollment and that universities are naturally facing pressure to increase tuition due to declines in non-tuition sources of revenue. Furthermore, applicants to financial aid programs were 3–4 percent more likely to enroll in college.<sup>67</sup>

Financial aid and grant money available to students is positively related to student enrollment, although recipients of scholarship and grants are received by different kinds of students.<sup>68</sup> Scholarships and grants are usually merit based and financial aid is need based. As governmental grants paid to a student increases the student's opportunity cost of forgone income is decreased while leisure benefits increase, which is due to an increase in the student's resources.<sup>69</sup> Furthermore, Kane found that a "wealth maximizing youth" would not delay college entry in the absence of borrowing constraints and the delay from entering college is more common in higher tuition states where the deferment benefits are lower than deferment cost.<sup>70</sup>

Seneca found that "access" to universities is negatively affected both by tuition levels and education quality of the university and positively affected by financial aid. Moreover, tuition

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<sup>65</sup> (Michaelis, 2008)

<sup>66</sup> (Michaelis, 2008)

<sup>67</sup> (Hemelt, 2011)

<sup>68</sup> (Hemelt, 2011)

<sup>69</sup> (Michaelis, 2008)

<sup>70</sup> (Kane T. , 1995) (Kane T. J., 1996)

levels do not have a significant effect on education quality while high tuition levels are indicators or associated with a high quality product.<sup>71</sup> In the absence of special efforts to retain students from “low-income backgrounds” successful competition will “crowd out” educational spaces for the low-income.<sup>72</sup> Seneca’s economic model assumes maximum utility behavior of government officials and found that universities seek academic prestige for “its own sake” and the fact that it helps attract good undergraduates is a fortunate side effect.<sup>73</sup>

Michaelis’s research suggests that larger enrollment numbers enhances the university’s survival. Specifically, Michaelis found that an increase in the quantity of students reduced students’ probability of graduating while increasing the future income of the students that have graduated, thus increasing enrollment must not necessarily come at the expense of reduced academic standards.<sup>74</sup> On the other hand Zimmerman thinks student loans are inefficient and need to be corrected in order to improve efficiency. Reducing or eliminating loan opportunities for students suggest lower enrollment due to the positive relationship between available aid and enrollment.<sup>75</sup>

Universities insist on keeping the nonresidential students at a higher tuition level to help subsidize the local student population.<sup>76</sup> Waugh found that universities would either have to raise all students’ tuition or place a quota on the out-of-state students in order to compensate for the loss in revenue of a lower nonresidential tuition.<sup>77</sup> Students are attracted to schools in states with favorable economic and environmental conditions and many states have sharply increased their

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<sup>71</sup> (Seneca, 1987)

<sup>72</sup> “Crowding out” in this sense is used as a literal meaning rather than the macroeconomic definition.

<sup>73</sup> (Seneca, 1987)

<sup>74</sup> (Michaelis, 2008)

<sup>75</sup> (Miles) (Hemelt, 2011)

<sup>76</sup> (Waugh, 1973)

<sup>77</sup> (Waugh, 1973)

nonresidential tuition charge.<sup>78</sup> Florida has favorable economic and environmental conditions that are consistent with “leisure” such as warm weather, beaches, and theme parks. Furthermore, a significant proportion of students do in fact seek work where they attend college.<sup>79</sup>

The process of determining tuition at a public institution differs from the process a private school would utilize, since the supplier is “not a profit maximizer” and does not receive all or even most of its funds directly from the consumer of the good.<sup>80</sup> The determination of tuition rates is guided by a political process that involves the state legislature in Florida. When conducting analysis on what variables influence the price of tuition, Rusk found that the foremost variable was the tuition charged by others in the “market area” especially in-state competitors. The public universities will respond to private universities’ higher price if they have a substantial portion of the market share.<sup>81</sup> Tuition and fees are lowest in states with less than 10 percent enrollment in private universities.<sup>82</sup> Surprisingly, there is no clear relationship between salaries of any given university’s faculty and tuition levels and the states with highest levels of support for their university system have the lowest tuition rates.<sup>83</sup>

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<sup>78</sup> (Morgan, 1983)

<sup>79</sup> (Morgan, 1983)

<sup>80</sup> (Morgan, 1983)

<sup>81</sup> (Rusk & Lesile, 1978)

<sup>82</sup> (Rusk & Lesile, 1978)

<sup>83</sup> (Rusk & Lesile, 1978) “Support” is funding from the university’s respective state. (Lugt, 1983)

## Methodology

I will create a generic budget maximizing function that is applicable to each of the universities that are appropriated performance based funding. Assuming *ceteris paribus* and using comparative statics, I will then compute how a change in a certain variable affects the budget of the university.<sup>84</sup> More specifically, I will create a function that will dictate how universities will interact when appropriated with twenty million dollars of state funds that must be split in proportion to each university's total score out of the overall score of the state university system of Florida. The Cournot equilibrium that I will be solving for is actually a subset of Nash equilibria; which is a stable state of a system involving the interaction of different players, where no player can gain by a unilateral change of strategy, assuming *ceteris paribus*.<sup>85</sup>

Secondly, I will collect data from the 2013 OPPAGA report on each nursing program's exam takers and passing rates. Then I will manually create a spread sheet of the data in Excel, which I can analyze with measures of central tendency. I can then subsequently upload the data into Stata in order to determine if the number of students or the number of exams passed has a significant effect on passing rates of pre and post licensed practical nursing programs. Furthermore, I will create a null and alternative hypothesis and conduct hypothesis testing at a 95 percent confidence interval. Although, the data is observational data and not random samples I am restricted due to financial reasons. I will assume certain assumptions which will be discussed in the "Model Assumptions" section of this paper.

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<sup>84</sup> *Ceteris paribus* – "with all other things the same"

<sup>85</sup> Cournot equilibrium – is a state of equilibrium where all the players in the game simultaneously maximize their profits given each of the other players profit maximizing functions.

In order to complete a linear regression test, I will assume that the two samples are identical and independently distributed, outliers are rare, and the expected value of the error, given a certain independent variable is zero. I will conduct four linear regression tests in order to determine whether the size of a nursing program or the number of exams passed have a significant effect on pre and post-legislation licensed nursing programs. Ultimately, I will calculate the t-statistic in order to reject or not reject the null hypothesis for each given analysis.

## Performance Based Funding

Table 2 Distribution and Metrics of Performance Based Funding in 2013

Benchmarks	Metric 1			Metric 2			Metric 3						
	Percent of Bachelor's Graduates Employed and/or Continuing their Education Further 1 Year After Graduation			Median Average Full-Time Wages of Undergraduates Employed in Florida 1 Year After Graduation			Average Cost per Undergraduate to the Institution						
	3	2	1	3	2	1	3	2	1				
	75%	65%	55%	\$40,000	\$30,000	\$20,000	\$20,000	\$25,000	\$30,000				
	Score			Score			Score			Total Score	%	Allocation	
FAMU	63%	1		\$28,864	1		\$37,071	0		2	4%	\$869,565	
FAU	69%	2		\$34,808	2		\$33,117	0		4	9%	\$1,739,130	
FGCU	70%	2		\$32,996	2		\$29,792	1		5	11%	\$2,173,913	
FIU	68%	2		\$35,264	2		\$26,791	1		5	11%	\$2,173,913	
FSU	63%	1		\$30,396	2		\$24,902	2		5	11%	\$2,173,913	
NCF	49%	0		\$22,366	1		\$74,832	0		1	2%	\$434,783	
UCF	69%	2		\$33,428	2		\$20,281	2		6	13%	\$2,608,696	
UF	63%	1		\$32,176	2		\$25,028	1		4	9%	\$1,739,130	
UNF	71%	2		\$33,264	2		\$28,562	1		5	11%	\$2,173,913	
USF	69%	2		\$33,466	2		\$23,276	2		6	13%	\$2,608,696	
UWF	60%	1		\$30,688	2		\$30,679	0		3	7%	\$1,304,348	
											46	100%	\$ 20,000,000

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### Funding Dispersion Structure

Performance based funding is a new funding source which was appropriated to the State University System of Florida in 2013. State universities will split twenty million dollars based on three indicative measures of performance, the “percentage of Bachelor’s Graduates employed or back in school a year later, average full-time wage for graduates a year after earning their degree, and average institutional cost per undergraduate.”<sup>87</sup> Each university will receive a ranking for each measure of performance on a scale of zero to three (three being the highest score a university can obtain and zero the lowest). Universities can receive zero points if they do not meet the tier one benchmark for performance; which varies for each of the three measures of

<sup>86</sup> (O’conner, 2013)

<sup>87</sup> (O’conner, 2013)

performance. Overall, none of the universities have met the third tier benchmark for any given measure of performance, which is shown in figure 2.

The performance based “benchmarks” only include data of graduates working in Florida. It seems reasonable to only reward the universities that retain or bolster Florida’s work force but pursuant to this fact, the performance measures do not account for the full impact a university has on the economy at a national level. Any student that graduates from a Florida university and leaves the state will not be included in the data that was collected and won’t influence what each university will score.

Metric 1 of the performance based funding provides incentives for universities to create programs within their universities that can directly inject their students into the work force. Universities can become more effective with their labor injection approaches by creating symbiotic partnerships directly with businesses. This is so students can readily enter the workforce with some practical experience.

The second metric gives incentives for universities to provide the upmost quality of education their facilities can possibly provide, in doing so they could augment the intellectual property of their students, thus increasing their starting salaries and self-worth. Furthermore, this measure creates incentives for universities to invest in expanding programs that promote high paying college majors.

The third metric promotes efficiency within the ranks. Each university will be rewarded more of the set funds for providing education as cheap as possible. The conglomeration of all 3



metrics creates incentives for universities to become more efficient in their statutory purpose, which is to economically satisfy the state's employment needs.<sup>88</sup>

The eleven universities will conduct themselves and their actions according to following:

### **Model Assumptions**

1. Universities behave strategically or rationally
2. Entry is blocked
3. Universities have differentiated cost
4. Universities have perfect information

Under the first assumption that universities behave strategically, universities are inherently considered to be budget maximizers, thus they prefer more money to less. Universities cannot simply be erected overnight. Universities must be reviewed and vetted by the Florida Board of Governors in order to be considered as a university that is eligible for state funds. Furthermore, universities are similar institutions and could have similar cost to run each establishment, such as normal cost of operation and research funds. The costs each university incurs are not identical and can vary from each institution due to the numerous influential factors such as the size of the institution. The State University System of Florida is transparent because information is readily accessible online, therefore each university knows the cost and score of all the remaining universities currently in the game<sup>89</sup>.

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<sup>88</sup> (§ 1001.60, Fla. Stat., 2014)

<sup>89</sup> The "Game" is an economic term for the interactions each university has on each other to obtain the end result.

## The General Model

*Equation 1 General Budget maximizing function for a University within the State University System*

$$Max S_i \left\{ B_i(S_1, \dots, S_n, C_i) = \frac{S_i}{\sum_{j=1}^n S_j} R - C_i \right\}^{90}$$

I created the budget maximizing function depicted in equation 1 in order to represent how each of the eleven universities will objectively decide how to maximize their budget when appropriated with legislative funds. In this equation the goal of each university is to maximize their overall score ( $S_i$ ) in order to capture as much of legislative funds ( $R$ ) as possible. The amount each university receives is dependent upon the score the university receives and the combined score of all the universities together, thus  $\frac{S_i}{\sum_{j=1}^n S_j}$  will always be within the interval  $[0,1]$ .

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<sup>90</sup> The Subscript (i) is use used to denominate one of the universities within the State University System that is competing for the funds, thus  $B_i$  denotes the Budget of a given University. The subscript (n) represents the number of universities competing, but (n) is variable to change in further years if the number of universities competing changes.

## *Comparative Statics*

### *Static 1 Partial Derivative of the General Budget Maximizing Function*

$$\frac{dB_i}{S_i} = \frac{\sum_{j=1}^n S_j - S_i}{\left(\sum_{j=i}^n S_j\right)^2} R > 0$$

Taking the partial derivative of equation 1 in respect to the score one certain university obtains, yields a very intriguing result show in Static 1.<sup>91</sup> The result derived in Static 1 shows that an increase in the score one university obtains will increase the budget or the amount the university wins from the set legislative funds up for grabs, holding everything else constant. This result is applicable to every player within the game due to each university's interdependence on each other.<sup>92</sup> Furthermore, from static 1 we can tell that as the score of a university increases the budget of the university will increase but at a decreasing rate. This is due to the denominator term,  $\left(\sum_{j=i}^n S_j\right)^2$ , which shows that increasing the score of any given university will exponentially increase this term, thus lowering the rate at which the budget of any given university's budget increases subsequent to rising scores.

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<sup>91</sup> Taking the partial derivative of a function assumes ceteris paribus- "holding everything else constant"

<sup>92</sup> A player in the game refers to each of the universities part taking in competition for the funds.

### **General Model Analysis**

At the first glance one might assume that the cost each player pays in a game is the associated lobbying cost in obtaining the funding in the first place, but the lobbying cost is actually a sunk cost that is lost the year of implementation.<sup>93</sup> After the year of 2013 the total cost ( $C_i$ ) would be any cost the operating university incurs by continuing to lobbyist efforts in order to maintain the appropriated funds.

The budget maximizing amount of any given university is determined simultaneously for all the universities. The budget a university receives is directly proportional to the score that given universities obtains and is inversely proportional to the total score of the entire State University School System. Universities do behave logically as budget maximizers due to their inherent nature universities as nonprofit organizations. Public universities were created in order to benefit society and stimulate the economy; they do not have stock holders or dividends to pay and there is no owner that directly profits from its operations.

The budget each player spends has no clear relationship with the score that player will score in the game. Furthermore, what each university decides spend their money in can vary across the board. For example, one university could spend their budget on recruiting efforts while another university could spend their budget on research and development. It could take years for each player to see results in an increased in their overall score from a change in their budget, due to the fact that the measures of performance are measured through student's education quality, price and how effectively the students are implemented into the job market. In

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<sup>93</sup> A sunk cost is a cost that a firm or player pays once over time and will not take the sunk cost into account when calculating the profit maximizing equilibrium.

order to further analyze the interactions between the players I have created a simpler representation of the game.

### **University Duopoly Model**

*Equation 2 University 1 in the University Duopoly Model*

$$\text{Max } S_1 \left\{ B_1(S_1, S_2, C_1) = \frac{S_1}{S_1 + S_2} R - C_1 \right\}$$

*Equation 3 University 2 in the University Duopoly Model*

$$\text{Max } S_2 \left\{ B_2(S_1, S_2, C_2) = \frac{S_2}{S_1 + S_2} R - C_2 \right\}$$

I have narrowed the players down to only two universities which can also be analyzed further with comparative statics. This duopoly game will help clarify exactly how each player will react to increases in their opponent's score. This new game will assume the four same model assumptions which were assumed for the general model.

*Static 2 in the University Duopoly Model*

$$\frac{dB_1}{S_2} = \frac{-S_1}{(S_1+S_2)^2} R < 0$$

*Static 3 in the University Duopoly Model*

$$\frac{dB_2}{S_1} = \frac{-S_2}{(S_1+S_2)^2} R < 0$$

*Static 4 in the University Duopoly Model*

$$\frac{dB_1}{C_1} = -1 < 0$$

*Static 5 in the University Duopoly Model*

$$\frac{dB_2}{C_2} = -1 < 0$$

Player 1 will suffer a decrease in its share of the legislative funds when the performance of its competitor increases holding everything else constant, which is shown in static 2.

Comparatively, player 2 will also suffer a decrease in its share of legislative funds when the performance of player 1 increases assuming *ceteris paribus*<sup>94</sup>, which is shown in static 3. Static 4 and 5 prove that the more a given player spends in increasing their overall score the fewer funds they will receive due to lobbying expenses and associated cost.

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<sup>94</sup> *Ceteris Paribus* “all other things held constant”

## **Licensed Practical Nursing Programs**

### **Background Information and Analysis**

In 2013, 24 out of 370 or 6.5 percent of the nursing programs in Florida were on probation with the new approval process in place.<sup>95</sup> The number of programs on probation is an indicative measure of inefficiency due to program requirements stipulated by The Florida Statutes.<sup>96</sup> These 24 programs did not maintain a passage rate greater than or equal 10 percent below the national average. The national average determined by the National Council of State Boards of Nursing was 85 percent, thus the subsequent required passage rate was 75 percent in 2013. There were 136 licensed practical nursing programs in the 2012 to 2013 school year. Fifty-three of the 136 licensed practical nursing programs were created since 2009 with the approval process, which equates to a 161 percent increase in licensed practical nursing programs since 2009.

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<sup>95</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>96</sup> (§ 464.019, Fla, Stat., 2014)



**Table 3 Licensed Practical Nursing Programs' Passing Rates and Exam Takers**

Nursing Programs	Total exam Takers	Total Exams Passed	Total Passing Rates
Pre-Legislation	3562	2939	82.51%
Post-Legislation	750	312	41.60%
Cumulative	4312	3251	75.39%

<sup>97</sup>

The post-legislation licensed practical nursing programs contributed 750 students to the 2013 NCLEX<sup>98</sup> testing, which is just a mere 17 percent of the total test takers according to Table 3. Furthermore, the students that the post-legislation programs produced were less prepared for the exam due to their lower passing rate. The pre-legislation nursing programs as a single entity not only passed the stipulated requirement of 75 percent, in order to avoid probation; they exceeded it by 7.5 percent. On the other hand the post-legislation nursing programs were more than 33 percent below the stipulated 75 percent, as a single entity.

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<sup>97</sup> "Pre-legislation" - denotes the licensed practical nursing programs that were erected before the 2009 Florida Statute modification

"Post-legislation" - denotes licensed practical nursing programs that were created since the 2009 Florida Statute modification

"Cumulative" - denotes the conglomeration of all the 136 licensed practical nursing programs in 2013

<sup>98</sup> NCLEX- Nursing's National Council Licensed practical Examination

## Measures of Central Tendency

**Table 4 Nursing Program's Averages**

Nursing Programs	Average Exam Takers	Average Exams Passed	Average Passing Rates
Pre-Legislation	42.92	35.41	78.37%
Post-Legislation	14.15	5.89	45.39%
Cumulative	31.71	23.90	66.52%

According to Table 4, the post-legislation programs are on average producing 28 less students than the already establish pre-legislation programs and have 29 less exams passed. This is evidence that the new programs are not as efficient compared to their pre-legislation counterparts, considering that the post-legislation programs account for 39 percent of the total number licensed practical nursing programs in the state of Florida. Ultimately, the difference in average passing rates confirms how ill-prepared the students coming out of these newly erected programs truly are, with an average passing rate 30 percent lower than the stipulated requirement and 40 percent lower than the national average.

### *Standard Deviation and Confidence Intervals*

**Table 5 Nursing Program's Standard Deviations**

Nursing Programs	Standard Deviation of Exam Takers	Standard Deviation of Exam Passed	Standard Deviation of Total Passing Rates
Pre-Legislation	30.74	26.54	25.94%
Post-Legislation	16.17	8.09	32.30%
Cumulative	29.55	32.42	25.73%

Analyzing the data, the standard deviations show the spread of the data points. The spread of pre-legislation program's exam takers and the number of exams passed is much larger than the spread of the post-legislation programs, shown in Table 5, due to the fact that the pre-legislation programs are much larger than the post-legislation groups, which is shown in Table 3 and 4<sup>99</sup>. However, the standard deviation or the spread of the passing rates of post-legislation programs are actually greater than the spread of the pre-legislation programs. The pre-legislation programs are more consistent with their already established and developed pedagogy, while the post-legislation programs are new and underdeveloped in comparison. Developing confidence intervals for each of the recorded statistics supports these deductions.

**Table 6 Nursing Program's Confidence Intervals**

Nursing Programs	Confidence Interval of Exam Takers	Confidence Interval of Exams Passed	Confidence Interval of Total Passing Rates
Pre-Legislation	0 - 104.36	0 - 88.49	26.49 - 100%
Post- Legislation	0 - 46.49	0 - 22.07	0 - 100%
Cumulative	0 - 90.81	0 - 88.74	15.06 - 100%

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<sup>99</sup> Figure 3 shows that there is a greater number of students in the pre-legislation programs and figure 4 shows that on average the pre-legislation programs are larger than the post-legislation programs.

In Table 6 I predicted the number of exam takers, the number of exams passed, and the total passing rates for any given program, with a 95 percent confidence. For instance, I can say at a 95 percent certainty that any pre-legislation nursing program will have in between no exam takers and 104 test takers. The confidence intervals for the pre-legislation group are larger for exam takers and exams passed because the standard deviations are higher, thus the spread is larger. The intriguing part is analyzing the confidence interval for total passing rates for each type of program. Statistically one cannot predict the passing rate of a post-legislation nursing program with a 95 percent certainty. The spread is so large that the possible passing rate could lie anywhere on a 0 to 100 spectrum.

When creating a confidence interval for post-legislation program's passing rates, which is two standard deviations from the mean, the confidence interval extends beyond the zero bound. The number of exam takers and the number of exams passed cannot logically be negative, negative human beings is simply and rationally impossible. Furthermore, a passing rate cannot drop below the zero threshold because a passing rate cannot be measured rationally in the negative range.

**Table 7 Linear Regression Outputs**

Dependent Variable:	<u>Model 1 (PRPreL)</u>			<u>Model 2 (EPPreL)</u>			<u>Model 3 (PRPostL)</u>			<u>Model 4 (PRPostL)</u>		
Independent Variable:	$\hat{\beta}$	SE	P-value	$\hat{\beta}$	SE	P-value	$\hat{\beta}$	SE	P-value	$\hat{\beta}$	SE	P-value
STEPReL	0.195*	0.1	0.055	--	--	--	--	--	--	--	--	--
STEPReL	--	--	--	0.82**	0.034	0.00	--	--	--	--	--	--
EPPostL	--	--	--	--	--	--	1.37**	0.401	0.001	--	--	--
STEPPostL	--	--	--	--	--	--	--	--	--	-0.229	0.284	0.424

Notes: \* denotes significance at the 10% level.

\*\* denotes significance at the 1% level.

(PRPreL) denotes Passing Rates of Pre-Legislation Licensed Practical Nursing Programs.

(EPPreL) denotes the number of Exams Passed of Pre-Legislation Licensed Practical Nursing Programs.

(PRPostL) denotes Passing Rates of Post-Legislation Licensed Practical Nursing Programs.

STEPReL denotes the number of Students Taking Exams of Pre-Legislation Licensed Practical Nursing Programs.

EPPostL denotes the number of Exams Passed of Post-Legislation Licensed Practical Nursing Programs.

STEPPostL denotes the number of Students Taking Exams of Post-Legislation Licensed Practical Nursing Programs

## Linear Regression and Nursing Programs

The test I conducted in Model 1 was done in order to test if the number of students in pre-legislation nursing programs has a significant effect on the passing rates these programs achieve. Analyzing the measures of central tendencies led me to believe that the size of the pre-legislation nursing programs did have an effect on passing rates because larger programs tend to be more established than the smaller programs. This can be seen in the nursing program's averages. My null hypothesis is that the coefficient on the number of students taking the exam,  $\beta$ , is not equal to zero and the alternative hypothesis is that the coefficient,  $\beta$ , is equal to zero.

$$H_0: \beta \neq 0$$

$$H_A: \beta = 0$$

The P-value is greater than .05, therefore I fail to reject the null hypothesis and conclude that the size of the pre-legislation nursing programs have a significant effect on each of the nursing programs corresponding passing rate.

The second test I undertook in Model 2 was analyzing whether the size of pre-legislative licensed practical nursing programs had a significant effect on the number of exams passed in pre-legislation programs. Using a similar null and alternative hypothesis as Model 1, I successfully conclude with a 5 percent rejection region that the size of licensed practical nursing programs does have an effect on the number of exams these programs pass every year and reject the null hypothesis.<sup>100</sup> Furthermore, one can analyze the linear regression model to interpret the

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<sup>100</sup>  $\beta \neq 0$   
 $\beta = 0$

relationship between the two variables. In Model 2, a one unit increase in the number of students in a pre-legislation licensed practical nursing program will increase the number of exams passed by .82 exams.

In Model 3 I determine whether the number of exams passed in post-legislation licensed practical nursing programs had a significant effect on the passing rates of post-legislation licensed practical nursing programs. Using a similar null and alternative hypothesis as Model 1, I can conclude with a 5 percent rejection region that the number of exams passed in post-legislation licensed practical nursing programs has a significant effect on the passing rates of post-legislation licensed practical nursing programs and reject the null hypothesis.<sup>101</sup> Furthermore, I can deduce that a one person increase in the exams passed causes a 1.37 percent increase in the passage rates of the post-legislation licensed practical nursing programs because the p-value is less than 5 percent.

Finally, Model 4 is conducted in order to determine whether the number of students each of the post-legislation licensing nursing programs contains has no significant effect on the passing rates of the post-legislation licensing nursing programs. Assuming similar null and alternative hypothesis as Model 1, I fail to reject the null hypothesis and conclude that the

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Null hypothesis – The coefficient of the size of the pre-legislative licensed practical nursing programs is not equal to zero.

Alternative hypothesis – The coefficient the size of the pre-legislative licensed practical nursing programs is equal to zero.

<sup>101</sup>  $\beta \neq 0$   
 $\beta = 0$

Null hypothesis– The coefficient of the number of exams passed by the post-legislation licensed practical nursing programs is not equal to zero.

Alternative hypothesis – The coefficient of the number of exams passed by post-legislation licensed practical nursing programs is equal to zero

number of students post-legislation nursing programs contain has no effect on the passage rates of those nursing programs.<sup>102</sup>

## Results Analyzed

In essence, the size or the number of exams administered by both pre and post-legislation's nursing programs has no significant effect on the passing rates those programs score. Furthermore, the number of exams passed by both pre and post-legislation's nursing programs has a significant effect on the passing rates of those programs. The results suggest that even if the newer post-legislation licensed practical nursing programs increased the size of their programs, their passing rates might not necessarily increase. The low passing rates of the post-legislation licensed practical nursing programs are not caused by how small their programs are but could be attributed to another factor or the conglomeration of numerous factors.

The low passing rates of the post-legislation licensed practical nursing programs could be contributed to factors such as the inexperience of their staff or the types of students these programs admit into their programs; however the results obtained cannot support these hypotheses because they are merely speculation. Other researchers could further this study by obtaining data pertinent to the speculated hypotheses and determine what other factors influence passing rates of licensed practical nursing programs.

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<sup>102</sup>  $\beta \neq 0$   
 $\beta = 0$

Null hypothesis – The coefficient of the number of students in the post-legislative licensed practical nursing programs is not equal to zero

Alternative hypothesis – The coefficient of the number of students in the post-legislative licensed practical nursing programs is equal to zero.



The correlation between the number of students passing exams and the passing rates is quite an intriguing conclusion. It seems pragmatic to surmise that licensed practical nursing programs that have more students passing exams will subsequently have higher passing rates due to their correlated nature. However, in order for this strong positive correlation between the number of exams passed and passing rates to make sense, licensed practical nursing programs would have to hold the size of their programs the same. The assumption of *ceteris paribus* is inherently presented in the linear regression model and creates a limitation to the results.

Pre-legislation licensed practical nursing programs would have little problems replicating these scenarios by keeping the size of their program stagnant for future years. On the other hand post-legislation licensed practical nursing programs would find it more difficult to replicate the linear regression correlation because several of these programs were very small, for instance 34 of the 53 post-legislation nursing programs have less than 12 students in their programs while only 14 of the 83 pre-legislation nursing programs have less than 12 students. Programs with less than 12 students will only need one teacher, which actually coincides with the statutory prerequisites to create nursing programs.

According to the Florida Statutes, the number of nursing programs faculty members should “equals at least one faculty member directly supervising every 12 students unless the written agreement between the program and the agency, facility, or organization providing clinical training sites allows more students, not to exceed 18 students, to be directly supervised by one program faculty member.”<sup>103</sup> The smaller programs can improve but will either need financial support from a third party or a larger student base to increase revenue and expand their

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<sup>103</sup> (§ 464.019, Fla. Stat., 2014)

program. An increase in their revenue and operational budget will allow the programs to provide more teachers for the students with different specialties, thus diversifying the curriculum and better prepare the students for the NCLEX testing.<sup>104</sup>

In the year 2013, post-legislation licensed practical nursing programs contributed a total of 750 students to NCLEX testing. Only 312 of those students passed the NCLEX test in 2013 and received their license to practice. The remaining 438 students were not as lucky and did not pass the NCLEX exam, ultimately being left with school debt and no benefits from their loans or their hard work. If hypothetically each student was required to take 50 credit hours in each of the licensed practical nursing programs and each of those credit hours cost 500 dollars then each student will have spent twenty-five thousand dollars on their education, whether they passed or failed the exam. Furthermore in this situation, if one assumes that these students had no way of repaying their debt, there would be \$ 10,950,000 of unpaid debt among the 438 graduates that did not pass their NCLEX exam.

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<sup>104</sup> NCLEX- Nursing's National Council Licensed practical Examination

## Conclusion

In essence, this research will supplement statistical research already in the field of university school systems. However, this paper sheds some light on universities and their behavior in the market that has not yet been shared in regards to competition for performance based funding. This paper is significant because it is not only applicable to Florida but to all of the United States or isolated education systems in the world. Moreover, the economic model could be quantitatively applied to the State University System of Florida, and any performance based funding which is appropriated within the system up to “n” universities.<sup>105</sup>

The research conducted particularly within licensed practical nursing programs could provide the Florida Legislature with insight to the effects of their statutory change in 2009. The result would more specifically inform just how efficient or inefficient chapter 464 of the Florida Statutes was in achieving its intended goal of increasing the supply of nurses in Florida. The results suggest reform of the Florida Statutes regarding the procedures for nursing program creation and approval.

Education at state universities is a club good because it is non-rivalrous and excludable. Education is non-rivalrous because one student’s consumption of education does not affect the consumption of another student, both students can receive the same education from the same teachers if there is no overcrowding. Education is an excludable good because universities can prevent people who do not pay for the good from consuming it. Furthermore, universities can engage in price discrimination to consumers, and can also discriminate admissions with

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<sup>105</sup> “n” refers the total number of universities in the State University System of Florida

educational criteria. i.e. anyone who has the money to consume the good cannot, unless the university deems that individual worthy of admission via educational criteria.

Performance based funding is efficient because it rewards high achieving universities, although if all the funds received in a university system were performance based there would be growing disparity between lower and higher academic institutions. The well performing universities would receive more money than the lower performing universities, thus the well performing universities would have more money to reinvest in themselves than their lower performing counterparts. Over time the disparity would grow, once the effects of reinvesting appropriated funds take effect. The indicative measures of performance for the higher performing universities will have a larger increase than their counterparts if all the budget gains were spent on reinvestment back into the educational establishment and the budget was geared towards increasing their performance.<sup>106</sup>

I conclude that the post-legislation licensed practical nursing programs are inefficient because more of the students who graduate from these programs fail their NCLEX nursing exam than pass.<sup>107</sup> Students will take out loans and forgo potential income in order to educate themselves in hopes of higher future earnings, but if these students fail the exam they will only have 6 months after graduation to pay their debt.<sup>108</sup> However, it is possible that the market for nursing education could be efficient in terms of welfare, operating where supply equals demand for the good, but there is not enough research in order to conclude it with certainty and thus will

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<sup>106</sup> This conclusion was drawn using deductive reasoning based on the assumption that universities are non-profit organizations and will spend all their budget on reinvestment. The reader should note that

<sup>107</sup> “Inefficient” in this case refers to the quality of the licensed practically nursing programs rather than total social welfare of the market or economy.

<sup>108</sup> (U.S. Department of Education, 2014)

remain pure speculation. Regardless of where the market lies in respect to welfare efficiency, the education quality of post-legislation licensed practical nursing programs are inefficient.

It can be interpreted that the 2009 legislation which changed the approval process was created in order to accommodate a higher demand for licensed practical nursing programs.<sup>109</sup> The 2009 legislation was successful in the purpose of increasing the number of licensed practical nurses but is not perfect. The Florida § 464.019 should be amended to make the requirements for the nursing program approval process a bit more difficult. The barriers to entry are minimal, if almost nonexistent, where almost anyone could create a nursing program to train students. All one would need is \$1,000, a program director, at least “50 percent of the program’s faculty members are registered nurses who have a bachelor’s or higher degree in nursing”, and “one faculty member for every 12 students” to start a nursing program.<sup>110</sup>

In essence, the Florida Board of Governors has a statutory duty to avoid “wasteful duplication of facilities or programs within the State University System” and through Florida’s § 464.019 the Florida Board of Governors is indirectly contradicting this duty by allowing organizations to create frivolous licensed practical nursing programs within the state.<sup>111</sup> Ultimately, organizations that create licensed practical nursing programs are a waste of Florida’s resources because these programs are systematically problematic with their low barriers to entry and have proved not effective in training potential nurses in Florida.

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<sup>109</sup> (Office of Program Analysis & Government Accountability , 2014)

<sup>110</sup> (§ 464.019, Fla, Stat., 2014)

<sup>111</sup> (§ 1001.70, Fla, Stat., 2014)

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