

## UNDEREMPLOYMENT IN NORTHWEST FLORIDA

Final Report – November 25, 2002

### *Executive Summary*

This report details Haas Center for Business Research and Economic Development findings on the relationship between Northwest Florida's low unemployment rate and a persistent earnings gap relative to the U.S. Not surprisingly, we find a strong relationship between the area's underemployment and the gap in pay.

Notable findings include:

- 1) Definitions of underemployment vary, but for the region, the concept has come to mean an economy where many workers cannot earn their potential income (IE., what they could earn in some other region);
- 2) Of three identified underemployment types, NW Florida appears to suffer from individuals who are overqualified for their current jobs and individuals who could be retrained for more productive employment;
- 3) Employers acknowledge a contribution to the wage gap in the difficulty finding the following skills: critical thinking, interpersonal, customer relations and computer;
- 4) Employers believe workers are drawn to the area and retained by the atmosphere for raising children, the beaches, the climate and the cost of living – probably leading to some worker immobility (and less competition for some occupations);
- 5) Employers also report difficulty filling managerial, engineers and manufacturing (skilled) positions;

- 6) Several new theories were developed following focus group sessions for NW Florida Human Resource managers. One concerned the tendency for some employers in the region to concentrate on reputation and avoid new technologies;
- 7) Occupations that are under-represented in NW Florida are generally on the higher end of the wage scale;
- 8) Employment projections include some positive news (e.g., high tech occupations in Tallahassee) and some less favorable expectations (e.g., food service in Pensacola, Fort Walton Beach and Panama City);
- 9) A large part of the regional wage gap can be called the Small-Southern-Metropolitan-Area (SSMA) effect, where workers in these areas typically earn less than workers in other regions and workers in larger Southern Metropolitan Areas;
- 10) The SSMA is more than \$60/week for the typical worker, this differential would only be reduced slightly if Pensacola's unusually large retail trade industry were replaced by jobs in communications and professional services.

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## *Background and the Literature*

Underemployment is generally said to exist when there is a discrepancy between a worker's current employment and "satisfactory employment." However, this definition is far from precise and there is no widespread agreement about how to measure this important employment problem. There have also been relatively few empirical studies and they use quite divergent definitions and measurement techniques. Previous underemployment studies have ranged from quantifying employee dissatisfaction with their current job to elaborate calculations of wage differentials. In addition, underemployment has been measured as a subjective variable as well as an objective variable and has sometimes defined as a continuous variable and sometimes as a dichotomous variable. These differences make it difficult to generate precise measurements of underemployment and they also make consistent comparisons between regions, genders, industries, etc. nearly impossible.

Conceptually, underemployment is of three different types. The first is involuntary part-time employment and includes workers who would prefer full time employment, but are working part-time for economic reasons that are beyond their control. In 1996 approximately 25% of the workforce was engaged in part-time or temporary employment and estimates suggest that 33% of the part-time and 66% of the temporary workers involuntarily held these positions due to an inability to find alternative full-time employment (U.S. BLS). In 2000 approximately 29% of the workforce was considered part-time or contingent. The growth of this contingent workforce is suggested to be one of the largest contributing factors to the growth of underemployment in the U.S. The second type of underemployment is associated with over-educated or over-qualified workers. These individuals have more education, training or expertise than their current job

requires. Historically, this underemployment has been associated with laid-off workers who are re-employed in new jobs, but a recent trend includes underemployment among new college graduates who find themselves competing with more experienced workers due to the elimination of mid-level positions due to corporate restructuring. This type of underemployment is often the hardest to identify since it involves a variety of factors that may be difficult to measure (e.g., training, education, aptitudes, abilities, preferences, etc).

Finally, the third type of underemployment involves unexplained wage gaps. Workers earning much lower than average wages fall into this category and are considered underemployed due to the notion that they could be re-trained and then re-hired in higher paying jobs. This pool of workers has long been considered a potentially valuable source of labor for regional economies that struggle with an overall wage gap. The largest problem with these measurements of underemployment is that they are neither mutually exclusive nor exhaustive.

The second and third types may be especially problematic for NW Florida. The area has numerous retired military personnel who are under 65, but not participating in the labor market (second type) and the recent growth of call center in the region involved retraining workers for jobs that pay on the order of \$8/hour (third type).

In an attempt to resolve some of the underemployment measurement problems as well as promote the comparability of relevant statistics, the Sixteenth International Conference of Labour Statisticians adopted a new resolution concerning the measurement of underemployment and inadequate employment situations (October 1998). In this resolution, time-related underemployment exists when “the hours of work of an employed person are insufficient in relation to an alternative employment situation in which the person is willing and available to

engage. Persons in time-related underemployment comprise all persons in employment...who satisfy the following three criteria during the reference period used to define employment: (a) willing to work additional hours, (b) available to work additional hours, and (c) worked less than a threshold relating to working time.” Inadequate employment situations are defined as “situations in the workplace which reduce the capacities and well-being of workers as compared to an alternative employment situation” and are divided into three distinct categories, skill-related inadequate employment, income-related inadequate employment and inadequate employment related to excessive hours. In addition, the resolution also makes suggestions as to the design of data collection and processing procedures so that analysts are able to report similar sample statistics for increased comparability.

Although comprehensive and/or comparative studies have not yet been conducted for measuring rates of underemployment, much research has been done on the consequences of underemployment and its impact on job performance, attitudes and overall mental health. In particular, underemployment has been consistently linked with poorer job attitudes, poorer job performance, and lower overall psychological well-being and mental health. Additionally, underemployment is often positively correlated with rates of absenteeism and job turnover, and negatively correlated to both the quality of interpersonal relationships as well as to organizational citizenship behaviors such as volunteering for committees, following work rules, etc.

Compared to the vast assortments of studies on the outcomes and consequences of underemployment, there has been relatively little research on the underlying worker factors contributing to high degrees of underemployment. However as will be discussed below,

economic factors, job characteristics, career histories, job search strategies, and demographic variables are hypothesized to be highly correlated with a worker's susceptibility to be underemployed.

### *Why Underemployment Exists (in General)*

A large amount of the research that has been done on the underlying market causes of underemployment focuses on the relationship between the overall state of the economy and levels of underemployment. Previous research (Elder, 1974) has suggested that deep recessions lead to higher levels of underemployment because of low job availability as well as the absence of many high paying jobs during these times. More recent research (Leana & Feldman, 1992) has suggested the opposite: high degrees of underemployment may be present in more prosperous times due to the increased inflexibility that employers have to layoff workers as well as the increased costs of hiring full-time permanent employees (i.e. governmental regulation of wages, benefits, etc). These increased costs during economic expansions have lead many employers to hire more temporary and sub-contracted labor and decrease the number of permanent employees, thus leading to higher degrees of underemployment.

Economic research also suggests that underemployment may be related to certain job characteristics and also may not be equally dispersed throughout firms. One particular example follows corporate cutbacks that have led to the elimination of many middle management positions. Here, researchers have hypothesized that remaining managers tend to be more susceptible to underemployment than non-managers. In addition, support staff have been deemed more susceptible to underemployment than line workers due to the view that their jobs

may be “less essential” than others and the work can be less location-specific. Finally, a higher degree of underemployment tends to exist among marketing and R&D employees than among finance, accounting and law professionals (D’Aveni, 1989).

Various components of an employee’s career history may also affect the probability of being underemployed. For example, employees who have been laid off in the past are more likely to be underemployed than those who have not. This may be due to the new employer viewing the layoff as a signal that this worker is relatively low quality (compared to other workers who have not suffered a layoff), or laid off workers may be financially constrained from their unemployment and forced to accept a new position at a lower wage (Tan, Leana & Feldman, 1994).

In NW Florida, the structural change away from apparel manufacturing may have created a new group of workers with these problems. Since new apparel jobs are rare, the former workers carry the signal (which may be misinterpreted as a worker problem rather than an industry problem) and are definitely financially constrained.

Underemployment seems to also be positively correlated with the amount of time that a recent graduate has remained unemployed (Winefield & Tiggemann, 1989). As with the laid off workers, this long period of unemployment may act as a negative signal to future employers and at the same time limited financial resources may force these recent graduates to accept some less-than-satisfactory employment. Along these same lines, there may be a negative correlation between the time and energy that students spend job-hunting while they are still enrolled and the likelihood of underemployment. This is most likely due to the fact that students who begin looking for employment earlier and more enthusiastically generally have more time to refine

their interviewing skills and have more potential job opportunities than students who delay their search (Liem & Liem, 1988). In addition, those workers who restrict their job search to certain geographic locations are more likely to be underemployed than those who are willing to relocate.

Finally, research has also identified that certain demographic characteristics increase a workers likelihood of being underemployed. Gender, race, age and education tend to be the most widely documented and discussed. For reasons that are not fully understood, women and racial minorities are more likely to become underemployed. Women may have a higher unemployment susceptibility due to a divorce that forces them to enter the workforce quickly or their willingness to settle for lower wages in order to balance their career with family demands. Differences between races have received less scrutiny, but the national unemployment rate for minorities is substantially higher than that of white workers. Finally, underemployment may also be positively correlated with age, and should be negatively correlated with education although evidence on these hypotheses are substantially more mixed.

#### *Why Underemployment Exists (in Northwest Florida)*

For the Underemployment in Northwest Florida project, Haas Center staff developed two research tools for understanding the employer environment in this region. The first is a survey of large employers in the region and the second is the feedback from a pair of focus groups that consisted of area Human Resource managers. The survey serves as a more objective research tool while convening the focus groups allowed Haas Center staff to clarify answers and to ask for elaborations from the respondents.

For the survey, large employers were the focus because these hiring staff would have more experience with the region's labor force. Unfortunately, of the roughly 40 surveys mailed, only nine complete responses were received. A response rate greater than 15 percent is generally good for survey research, but a limiting factor here is the small number of the target population (large employers) for the region.

The respondents reported average employment of more than 450. They collectively claimed more than 1000 new and replacement hires in 2001. This large-scale activity met the goals of the employer survey for this study.

The first set of questions addressed employer beliefs on worker skills. The objective here was to try and establish whether employers had trouble obtaining skilled workers. If difficulties exist – especially relative to other areas of the country – the skill gap could push NW Florida labor markets toward lower-skill occupations and the underemployment problem could persist.

The first finding, in the top row of Table 1, is that employers are neutral regarding the existence of an overall skill gap. This is neither good nor bad news to policymakers as survey respondents did not strongly agree with the gap statement, but did not strongly disagree either (not shown). Turning to the more specific skill questions, three areas concerned the survey respondents. The first is interpersonal and customer relation skills (average of 3.9 and 3.6 respectively). These skills are not typically addressed in educational institutions and, in general, workers acquire these skills in job training or from more experienced colleagues.<sup>1</sup> The answers

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<sup>1</sup> Kelly, W. (1993), "Training: just plain lousy or too important to ignore?", *Sales and Marketing Management*, March, pp. 66-70.

indicate that for the new employee, the previous employer did not provide adequate training or strong guidance.

The second area of respondent concern regards the responses to the adequacy of computer skills. In this case the mean is 3.7 and the median is 4.0. As the United States continues to move toward the new, knowledge-based economy, these skills are essential and when good computer skills are difficult to find in NW Florida, any deficiency acts as an important barrier for economic development.

The final area regards the opinion on critical thinking skills. Critical thinking can be summed up as the ability to,

“recognize, analyze, and assess the basic elements of thought: the purpose or goal of the thinking; the problem or question at issue; the frame of reference or points of view involved; assumptions made; central concepts and ideas at work; principles or theories used; evidence, data, or reasons advanced, claims made and conclusions drawn; inferences, reasoning, and lines of formulated thought; and implications and consequences involved.”<sup>2</sup>

For the regional economy, workers with critical thinking skills should be more likely to find ways to increase their productivity and earn pay raises. When employers cannot find workers with critical thinking skills in NW Florida, they may look to other regions.

One area of research interest is employers beliefs on what workers value about the region. The goal here was to determine which amenities were important to the current workforce and to help the communities of NW Florida both enhance and market these attributes. We caution that the same values may not be completely compatible toward drawing new workers

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<sup>2</sup> The National Council for Excellence in Critical Thinking web site  
<http://www.criticalthinking.org/ncect.html> (accessed on November 21, 2002).

(e.g., an initiative to bring new physicians may fail if it focuses on the values of Navy pilots), but they should be generally indicative of the forces that draw households to the region.

The four attributes that received the strongest support are the atmosphere for children, the beaches, the climate and the cost of living (Table 2). Each had a median of 4.0 and the averages fell between 3.8 and 4.0. The other quality-of-life items received some respondent support – IE., the average was greater than 3.0 – but employers do not respond as strongly to these amenities. Interestingly, all of the quality-of-life measures have low variance estimates indicating relative uniformity on the respondent beliefs.

The final set of attitudinal questions concerned the difficulty in filling particular occupations (Table 3). Managerial, engineers and manufacturing (skilled) positions were relatively difficult to fill with an average response greater than 3.6. Not surprisingly, responses indicated that clerical and service jobs were not difficult to fill.

Table 1  
Employer Attitudes on Skills  
(5 = Strongly Agree)

	Average	Median	Variance
An Overall Skills Gap Exists	3.1	3	0.86
<i>The firm has difficulty finding the following skills</i>			
Critical Thinking Skills	3.7	4	0.50
Computer Skills	3.7	4	0.50
Equipment Operation Skills	3	3	1.50
Interpersonal Skills	3.9	4	0.61
Customer Relations Skills	3.6	4	0.53
Clerical and Administrative Skills	2.9	3	0.61
Wage Gap Reflects Livability	3	3	1.00



Table 2  
Employer Attitudes on Regional Attributes  
(5 = Strongly Agree That Workers Value)

	Average	Median	Variance
Atmosphere and activities for Children	3.9	4	0.11
Cultural atmosphere and night-life	3.1	3	0.36
Beaches	3.8	4	0.19
Climate	4	4	0.25
Golf and fishing opportunities	3.4	3	0.28
Cost of living in Northwest Florida	4	4	0.75
Natural beauty/scenery/historical sites	3.3	3	0.25
Quality restaurants and shopping	3.2	3	0.19

Table 3  
Employer Attitudes on the Difficulty Filling Select Job Types  
(5 = Strongly Agree That Type Is Difficult)

	Average	Median	Variance
Managerial/Supervisory	4	4	1.00
Clerical	2.3	2	0.25
Computer Technicians/Operators	3.1	3	0.86
Computer Engineers/Analysts	4.2	4	4.69
Engineers (non-computer)	3.8	4	3.25
Professional	3.7	4	0.75
Sales/Marketing	3.3	3	2.36
Laboratory/Technical	3.3	3	2.28
Manufacturing (skilled)	3.8	4	3.78
Laborers (unskilled)	3.1	3	2.19
Scientists	2.8	3	2.53
Service	2.7	2	1.36
Positions Remaining Open for More than 6 Months	3.7	4	0.50
More Applicant Screening Required Recently	3.3	4	1.25

Turning to the focus group research, two groups – one in Fort Walton Beach and one in Pensacola – were convened in May of 2002 with a goal of developing new insights on labor market issues in NW Florida. The participants were generally Human Resource (HR) directors for area firms and the event was coordinated by Dr. Chris Pierce, Fort Walton Beach director for the Haas Center. From interacting with the participants, six new theories on why underemployment and low wages persist in this area were developed. These theories also appeared in the Fall, 2002 edition of the Haas Center’s Northwest Florida Regional Economy publication.

1. Firms that Rely Heavily on Reputation.

One human resource director introduced the idea that when there is limited competition and firms that rely on reputation (and contacts), the owners of the firms will be reluctant to innovate or adopt new technologies.

As a metaphor, picture a waterfront community with three charter boats and customers with a tendency to hire the boat they know. The boat owners are going to ask employees to concentrate on relationships – and even seek applicants who have strong community relationships – rather than the latest devices for catching fish. Overall, the total catch of fish is held back by the individually rational decisions of the owners.

If lawyers, accountants and even charter boat owners in NW Florida are not aggressively seeking new technologies, productivity gains may not be realized. Since productivity gains are the key to real wage increases – the lawyer who finds a way to see more clients is the lawyer

who will earn a pay raise – the manager that concentrates on reputation is probably maximizing market share today and sacrificing productivity gains tomorrow.

To some degree, this problem probably exists in most small cities and is not specific to NW Florida. Also, since population in this region continues to grow at a healthy pace, the ability to use reputation (without concentrating on developing new talents) will diminish.

## 2. Firms that Need Generalists.

Another important idea arose when some of our HR directors reported a need for employees who can perform a wide array of tasks. They believed that in larger metropolitan areas, similar firms used more specific occupations. For example, an accounting firm in NW Florida might ask a new accountant to perform additional duties that a Tampa firm has a specific staff member perform.

For the economy, a lack of specialization can restrain productivity increases. The accountant in the example above will not be focusing on one task and should not be able to focus on doing that task better. Since productivity increases are the key to real pay raises, generalists will not be able to create new wage increases.

This problem should also diminish as the region grows. In services, for example, one generally finds a mix of large and small firms in a large metropolitan area and employees at the large firm are able to specialize.

## 3. The Adjustment for Imported Employees and Spouses.

Several HR directors reported problems with importing employees and spouses in order to fill high-skill occupations. In their experience, many new transplants to the region were frustrated in their new community and this is problematic for the economy when a regional office avoids creating high-skill positions here. For example, an engineering firm in the region may choose to borrow a specialist from another office rather than hire one and relocate that person to NW Florida.

Like any area, the communities of NW Florida have advantages and disadvantages. The HR directors generally believe that the acclimation process is slow – meaning the transplant does not easily acquire information on the advantages and disadvantages.

This may be a problem that the Chamber of Commerce in each metropolitan area can address. These organizations produce relocation materials and, in the future, may expand events for new transplants.

#### 4. Affordable Transportation from the Rural Areas

The feasibility of providing transportation to employees from rural areas had been investigated by a number of HR directors. Most reported difficulty in coordinating this type of job benefit, but the level of interest was surprising.

For the economy, transportation barriers mean workers are not matched with their best job and jobs are matched with the best worker. In the worst-case scenario, a transportation barrier interferes with job creation. Also, this problem may get worse over time. If employers are not clustered and if workers clock in at different times, a coordinated (or even public) transportation system is expensive.

## 5. Applicants and Employees That Reject Constructive Criticism

Stubbornness is desirable when it leads to persistence and undesirable when it interferes with personal improvement. The HR directors singled out the 29-39 year old cohort and the ex-military as somewhat more stubborn than average (the latter group is not surprising as persistence is extremely important to the military).

Stubborn and inflexible employees will be less likely to improve their own productivity through new ideas and technology. It is not clear, however, how large of a problem these employees represent for NW Florida. Every community has stubborn and inflexible people – the concentration and overall effect of these characteristics are difficult to assess.

## 6. Reluctance to Poach

HR directors remain sensitive about hiring employees away from rival firms. They refer to this as poaching and the practice can cause ethical and legal problems for employers.

A strategy of never hiring from a rival, however, helps firms in a community maintain below-market wages. If a housekeeper earns \$6.50/hour and is worth \$7.50, rival firms should demand his services and push the wage up.

The participants for the Haas Center focus groups were not eager to poach, but were certainly willing to hire a rival's employee when the individual had actively sought employment. This does not appear to be a strong barrier on the mobility of workers.

### *Underemployment Measures for the Southeast Region*

Various consulting and research companies have been funded to examine the extent to which underemployment exists in different regions. One such study was conducted by PFResources for the Pensacola, Florida area (Escambia, Okaloosa, Santa Rosa and Walton Counties and portions of Baldwin counties). This study estimates the pool of underemployed workers to be around 36,400 and mainly focuses on comparing the Pensacola area to other areas in which PFResources has conducted similar studies. Telephone interviews were conducted with a random sample of individuals in order to determine the availability for work with a new employer, desired wage levels, as well as certain demographic variables (such as age, gender, education, experience, and commute time). To the extent that each individual viewed him- or herself as underemployed is the extent to which they were counted as underemployed in this study. This poses a problem in that it makes no distinction between the objective and subjective components of underemployment discussed earlier.

The Pensacola study also consisted of data gathered from interviews with senior management and human resources personal from local companies. Each of these employers was asked to provide rankings of labor productivity, availability, attitudes and costs in the Pensacola, Florida area. These rankings were then compared with similar data collected for other survey areas. The results indicate that the Pensacola area consistently scored below the median in each of the ratings category<sup>3</sup>. The categories were worker productivity, availability of skilled workers, availability of unskilled workers, reading/writing competency, and calculations competency. In addition, the collected data shows that the desired pay rates in the Pensacola

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<sup>3</sup> In particular, the Pensacola area had a lower percentage of responses that were “Excellent” or “Good” than the median percentage of these responses for each category.

area are consistently higher than the median pay rate of all survey areas. This represents another weaknesses of the study in that it does not present any link between the wage levels desired by individual workers and their skill level. PFResources also conducted another study of underemployment in Jefferson County, Kentucky. This study was identical to the Pensacola study.

Another study of underemployment was conducted for the Alachua County, Florida area. This study was conducted by Lockwood Greene consulting, and funded by the Gainesville Council for Economic Outreach. In order to evaluate the level of underemployment in the Alachua county area, Lockwood Greene conducted four hundred telephone interviews with households, one hundred mail surveys were sent to local businesses in the area ranging from small shops to larger employers, and personal interviews with approximately thirty organizations and companies in the area were conducted. This study found that, as expected, a higher degree of job dissatisfaction existed with part-time employees (13%) versus full-time employees (9%). They also found that 67% of these part-time employees were involuntarily employed part-time and when asked why they continued to be underemployed indicated that no other full-time positions existed in the area. In addition, the majority of these workers reported working for small businesses (up to 25 employees). As discussed earlier, a more in-depth analysis of this part-time and contingent workforce is an important component of any measurement of underemployment since these workers are suggested to be one of the largest contributing factors to the growth of underemployment in the U.S. An analysis of employers' responses indicated that slightly over 37% perceived underemployment to be a problem for their business. In

addition, over 65% felt that underemployment existed to a larger degree in the overall Gainesville and Alachua County area.

As with the Northwest Florida community, Alachua County enjoys a very low unemployment rate. Of the unemployed individuals surveyed, 70% indicated that they were actively seeking either part-time or full-time employment. However as pointed out in the report, often these unemployed individuals lack the desired skills needed by local employers. In addition, previous surveys have indicated that a very small percentage of new full-time hires come from the pool of unemployed workers in the region (Moline, 2000). The Alachua County study does mention at one point the “trailing partner” issue and that underemployment may exist to a larger degree in communities with a large military or university presence, however there is no attempt to quantify to what extent this is an issue in the Gainesville area. Also, the study compares regional wages to both nation-wide and state-wide averages using data from the Occupational Employment Statistics (OES) wage survey conducted by Florida’s Department of Labor and Employment Security<sup>4</sup>, however no distinction between a pure wage gap and an occupational wage gap is made. In addition, no allowance is made for differences in employees’ age, gender, education or other worker attributes that may also account for some of the wage differential between Alachua County and other areas. Also, as with the Pensacola and Jefferson County studies, the Alachua County report makes no distinction between the objective and subjective components of underemployment discussed earlier.

A telephone survey of underemployment was also conducted by The Pathfinders for the East Central Alabama area. This report estimates that approximately 24% of the available

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<sup>4</sup> This is a yearly survey by Florida counties and may be downloaded directly from the myflorida.com website (<http://www.myflorida.com>).

workforce in this area is underemployed. However the bulk of this study is simply a collection of various graphs and charts which report the percentage of respondents with certain characteristics. No comprehensive analysis or calculations were made here.

Outside of the Southeast, a joint venture between the Nebraska Department of Labor and the University of Nebraska resulted in a very interesting study for that state. This study was somewhat unique in that the same survey was conducted in 1992 and again in 1996 and the results compared. As mentioned earlier, consistent measures of underemployment for specific regions are rare but very useful in determining either intensifying or lessening pressures of underemployment through time. The Nebraska study also focused on growing concerns in the area regarding the increased reliance of employers on the contingent workforce. “Specifically evaluated was the relationship between a more flexible work force and the extent to which it contributes towards underemployment.” The survey focused on various demographic features of full-time, part-time, and overqualified workers and can be seen in Appendix C. Again, it was found that the majority (87%) of full-time temporary workers feel that they are working on a temporary basis due to a lack of permanent job opportunities. Results from these surveys were compared for the 1992 and 1996 responses and findings indicate that underemployment in Nebraska has deepened over this time period.

Subsequent studies that attempt to measure regional underemployment and wage differentials will need to learn from the mistakes of their predecessors. Underemployment consists of both subjective as well as objective components, and any true measure of underemployment will need to encompass both. In addition, many of the previous studies are weak in that they fail to differentiate between what the economic literature calls contribution

versus consumption equity. Consumption equity addresses the preferences of individuals across different consumer goods, wages and/or job tasks. Contribution equity moves one step further and deals with the capability of the individual to accomplish the tasks required to obtain the preferred consumption bundle (i.e. the preferred consumer goods, wages and/or job tasks). Accurate measures of underemployment must be sure to limit the survey field to cases in which it is feasible for the individual to obtain that wage or job position that he or she prefers to have.

Furthermore, the assumption that some degree of underemployment may be eliminated by closing the wage gap and at the same time attracting more highly skilled workers to the area in question may need further examination. This hypothesis assumes that the businesses or employers in question operate within a wider labor market than just the surrounding locale. According to this general labor market approach, these employers “do not employ workers in isolation from the dynamics of local labor markets and must be prepared to pay the ‘going-rate’ for the labor they require.” (FEFC, 1999) However to the extent that this is not the case in Northwest Florida, it may not be essential that employers in the area pay the nation or state-wide ‘going-rate’ in order to successfully hire skilled employees from the labor markets in which they compete. This point may want to be thoroughly investigated before any conclusions are drawn.

### *Job Types for Northwest Florida*

In addition to looking at the pattern of hourly wage rates as compared to national figures, employment figures also need to be examined for these Northwest Florida regions in order to more accurately determine the source(s) of the wage gap. Year 2000 employment figures for both the Northwest Florida MSAs as well as the U.S. were used to construct estimates for

employment by occupation as a percentage of total employment. Then, similar to the wage rate analysis, employment percentages for each occupation in Northwest Florida are reported in terms of a percentage above or below the national employment percentage for each occupation. The results are shown in Table 4 below.

Table 4  
Relative Employment Differential for NW Florida Metropolitan Areas

Occupation Title	Percent employment above or below US avg			
	Pensacola	Fort Walton Beach	Panama City	Tallahassee
Architecture and Engineering	-16.90	48.10	22.80	-12.40
Arts, Design, Entertainment, Sports, and Media	-16.30	-2.10	-25.00	58.30
Building and Grounds Cleaning and Maintenance	0.40	27.80	35.10	15.20
Business and Financial Operations	-15.90	-22.20	-35.40	118.30
Community and Social Services	8.30	-13.00	10.70	23.10
Computer and Mathematical	-51.30	-12.90	-57.50	53.60
Construction and Extraction	25.10	6.30	20.90	-18.90
Education, Training, and Library	41.00	NA	NA	44.50
Farming, Fishing, and Forestry	-64.90	-75.90	-80.70	-71.80
Food Preparation and Serving Related	6.70	43.10	59.30	-10.80
Healthcare Practitioners and Technical	35.90	18.00	26.10	-3.50
Healthcare Support	2.00	-19.60	12.10	18.90
Installation, Maintenance, and Repair	19.70	26.40	8.5	-26.00
Legal Occupations	3.90	-50.10	-45.00	187.40
Life, Physical, and Social Science	-10.00	40.90	-33.50	63.20
Management	-5.70	-0.80	-19.00	3.80
Office and Administrative Support	4.10	5.40	0.60	20.30
Personal Care and Service Occupations	6.20	6.30	13.80	-33.10
Production Occupations	-40.10	-49.50	-51.70	-70.40
Protective Service Occupations	-4.40	-15.70	-0.80	-25.60
Sales and Related	12.40	11.30	27.50	-4.30
Transportation and Material Moving	-27.50	-34.20	-34.80	-48.30

As can be seen from the figures, the majority of occupations which have significantly less employment in Northwest Florida as compared to national averages are primarily the middle to

high wage occupations. For example in Pensacola, the average wage rate for occupations in which the percent of total employment is less than 80% of the national percentage is \$12.60/hour. Similarly, the average wage rate for these low-employment occupations is \$12.10 in Fort Walton Beach, \$15.30 in Panama City, and \$10.70 in Tallahassee. This raises an interesting question as to whether the wage gap in Northwest Florida is simply due to the fact that there are less high paying jobs in the area or whether there are other factors causing wages to be lower in the region.

Job growth estimates offer mixed news for the region’s metropolitan areas (Table 5). Tallahassee is expected to gain a significant number of high tech workers, but the other areas may not match Florida’s relative growth rate for technology occupations (6.4 percent in the table). Two of the areas, Fort Walton Beach and Tallahassee are expected to do reasonably well in new management positions, but the growth in food preparation jobs also appears to be robust across the Northwest Florida.

Table 5  
New Employment Projections For Select Occupations as a Share of All New Jobs

	Pensacola	Fort Walton Beach	Panama City	Tallahassee	Florida
High Tech Workers	4.1%	5.7%	3.3%	9.6%	6.4%
Management	6.3	7.6	8.1	7.2	7.3
Healthcare Practitioners	7.2	4.8	7.7	7.6	6.9
Food Preparation	8.4	8.7	10.4	5.2	5.6
Sales	12.7	13.2	14.1	14.1	13.4
Transportation and Material Moving	4.3	3.3	2.4	3.0	3.9

Note: High-Tech Workers include Computer Specialists, Engineers and Scientists. This definition follows a recent study by Federal Reserve economists (need cite).

Source: Florida Agency for Workforce Innovation

### *Wage Gap Evidence for Northwest Florida*

The question of whether or not evidence exists of a “wage gap” between Northwest Florida and the United States as a whole, and Northwest Florida and the State of Florida serves as an important starting points for the investigation into the study of local underemployment, with special emphasis on the likely sources of the wage gap. Data is available from Occupational Employment Statistics (source: Bureau of Labor Statistics) which breaks down all industries into a number of employment fields for each of the four major Northwest Florida MSAs: Pensacola, Fort Walton Beach, Panama City, and Tallahassee. The breakdown of each city’s industry structure is the result of a 1999 survey which publishes the raw number of workers affiliated with each sector, as well as the percentage of workers found in each. A median and average wage is also calculated based on survey responses.

Each of the four Northwest Florida MSAs was compared individually, via the data, to the United States in general, and the State of Florida in general. First, a simple analysis was conducted by comparing the median wage rates of the city in question and the national or statewide median wage. The median is used because it is more robust than the mean since extreme cases do not affect the median statistic nearly as much as they do the mean.

The Pensacola MSA has twenty-one reported occupational groups. Of these groups, only one (education and library professions) had a higher median wage locally than nationally. The twenty occupational groups had an average annual median income of approximately \$4,000 less than the average annual median income in the United States (weighted by number of people employed in each field, as all of these difference estimates in this paper are). The raw data certainly seem to indicate that pure wages in the Pensacola MSA are almost unilaterally lower than in the nation at large.

To statistically test the assertion that the Pensacola MSA has lower wages than the nation or state, a matched pairs test was conducted on the data using the Wilcoxon Rank Sum Test. This test compares the Pensacola MSA to the nation as a whole by comparing the median wages in each sector of employment. First the Pensacola MSA was tested against the United States using the raw data. The null hypothesis was that the wages in Pensacola and in the U.S. were equal, and the alternative hypothesis stated that Pensacola wages are lower than U.S. wages. The null hypothesis was rejected by this test, and we conclude that evidence exists that the Pensacola MSA has lower wages than the entire U.S. with a p-value of less than 0.001. Next, on a statewide level the data was used to again conduct a similar matched-pairs test. That test concluded that Pensacola's wages were also lower than state wages with a p-value of 0.00131<sup>5</sup>.

The Fort Walton Beach MSA has twenty reported industrial sectors. The raw data shows that of these twenty sectors, only three (protective services, architecture and engineering, food preparation and service) had higher median wages reported in Fort Walton Beach than in the United States. The average raw median income was \$4,900 (weighted) higher in the U.S. than in the Fort Walton Beach MSA. The matched pairs test for Fort Walton Beach revealed evidence that wages are lower in the local MSA than in the entire United States. First, the raw data was used in a test that provided a p-value of 0.001. Thus the null hypothesis of equality of local and national wages should be rejected in favor of the hypothesis that wages are actually lower in Fort Walton Beach. The data for Fort Walton Beach and the State of Florida were used in a matched pairs test as well. A p-value of 0.0202 resulted from the test, indicating strong evidence in favor of rejecting the hypothesis that wages were equal in Fort Walton Beach and the State of Florida

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<sup>5</sup> These tests were also conducted after adjusting for the cost of living in each MSA using ACCRA adjustment figures. These results can be found in Appendix A.

as a whole. It seems that wages are significantly lower in Fort Walton Beach based on this test of the raw data.

Panama City was also analyzed with reference to the United States as a whole. Nineteen fields of employment were reported in Panama City, and the median wages were higher in Panama City (compared to the entire U.S.) in only one field, legal professions. The median raw annual income was approximately \$4,600 lower in Panama City than nationally. Matched pairs tests were again conducted, this time contrasting the Panama City data with the national data. The raw data provided another rejection of the null hypothesis of equal wages (strong p-value of 0.0001), and thus in yet another Northwest Florida MSA, we have good reason to believe that wages are significantly lower than national standards would predict. A test was also conducted comparing the Panama City wages to those found statewide. That matched pairs test resulted in a p-value of 0.0009, strongly indicating that the state of Florida has higher wages than the Panama City MSA.

The Tallahassee MSA has some differences from the other three Northwest Florida cities. Only seventeen of the potential twenty-two employment fields were represented in the Tallahassee data. While that is not necessarily problematic, it indicates a potential lower level of certainty that the figures truly encompass the entire spectrum of employment in the Tallahassee area. The same analysis techniques were used, however, to investigate the possibility of a wage gap between Tallahassee and the nation and state. The raw data indicated that the average median annual earnings were \$980 lower in Tallahassee than the U.S. average.

The matched pairs test was used to compare Tallahassee wages to the U.S. as well, and using the raw data, we were able to reject the null hypothesis of equality with a p-value of 0.00798. Testing the Tallahassee raw wages against the median wages of Florida in a matched pairs test resulted in a p-value of 0.176. While this type of p-value is generally not considered

strong enough to reject the hypothesis of equality of wages, it should be remembered that there are indications that the value of a dollar is significantly lower in Tallahassee when compared to the average power of the dollar throughout the state (i.e. the cost of living is higher in Tallahassee than in the rest of the state of Florida).

Each of the four Northwest Florida MSAs we investigated showed significant wage gaps when compared to the United States as a whole. In addition, the tests run to determine the significance of this wage gap were generally very conservative; that is, if anything, the tests erred on the side of assuming that no wage gap exists. Because of the conservative nature of the tests, and the existence of considerable evidence of a wage gap, we believe that pressing forward into the investigation of the causes and effects of this gap is justified.

It will also be useful not only to show that a significant wage gap exists for the Northwest Florida MSAs analyzed thus far, but also to examine more closely the potential sources of this gap. To begin, median hourly wage rates for various occupations in the Northwest Florida region were examined as compared to the median hourly rate for the United States as a whole in attempts to examine if the wage gap which exists in Northwest Florida is limited to only specific occupations or whether this gap tends to be more widespread. In particular, median wages in each Northwest Florida MSA are reported in terms of a percentage above or below the national figure for each occupation. For example, if the median hourly wage rate for widget makers were \$10 in Pensacola, FL and \$20 on average in the U.S., then it would be reported that the hourly wage rate in Pensacola is 50% below the national average. As can be seen from the results below, in general wages in Northwest Florida appear lower than national averages for most every occupation. Nonetheless, on average median wages were 11.3% lower in Pensacola, FL, 13.7% lower in Fort Walton Beach, FL, 13.6% lower in Panama City, FL, and 6.7% lower in Tallahassee, FL than national median wage rates in 2000.

When weighted by the percent of the population actually employed in each of these occupations, median wages appear to be even lower across the four MSAs. In particular, median wages are 13.0% lower in Pensacola, 14.5% lower in Fort Walton Beach, 16.3 % lower in Panama City, and 6.8% lower in Tallahassee than national median wage rates after taking into account the percent of the population employed in each occupation<sup>6</sup>. In addition, 90.9% of occupations in Pensacola report median wages which are less than national median wages. Similarly, 95.2% of occupations in Fort Walton Beach and Panama City, and 81.8% of occupations in Tallahassee all report median wages less than their corresponding national figures. Thus it appears that the significantly lower wage rates observed in Northwest Florida are not limited to a small number of occupations, but instead affect the majority of workers in these areas. In addition, the largest discrepancies in wages between Northwest Florida and the nation as a whole tend to be seen in the mid- to high-wage occupations. The occupations in which regional wages are 20% less than the U.S. average have an average wage rate equal to \$15.53 in Pensacola, \$12.53 in Fort Walton Beach, \$14.88 in Panama City and \$15.39 in Tallahassee. More detailed results can be seen in Table 6 below.

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<sup>6</sup> Specifically, median wage rates for each occupation in Northwest Florida as well as the U.S. were multiplied by the percentage of individuals employed in each occupation (with total employment = 100%). These figures are then summed across occupations in order to calculate the weighted average for each region.

Table 6  
Regional Wages Relative to U.S. Wages by Occupation

Occupation Title	United States Median Wage Rate	% median wages above or below US			
		Pensacola	Fort Walton Beach	Panama City	Tallahassee
Architecture and Engineering	\$24.77	-21.10%	-0.50%	-1.70%	-22.20%
Arts, Design, Entertainment, Sports, and Media	\$15.76	-21.30%	-29.10%	-18.30%	-16.00%
Building and Grounds Cleaning and Maintenance	\$8.36	-19.30%	-5.40%	-10.30%	-12.60%
Business and Financial Operations	\$21.10	-19.40%	-8.20%	-21.80%	-19.80%
Community and Social Services	\$14.54	-11.40%	-9.50%	-15.30%	-10.00%
Computer and Mathematical	\$26.49	-23.00%	-5.90%	-26.10%	-22.50%
Construction and Extraction	\$15.14	-30.20%	-29.00%	-27.60%	-25.10%
Education, Training, and Library	\$16.78	12.50%	NA	NA	37.80%
Farming, Fishing, and Forestry	\$7.34	50.40%	28.60%	39.40%	36.90%
Food Preparation and Serving Related	\$6.81	-3.40%	-1.80%	-5.40%	-3.40%
Healthcare Practitioners and Technical	\$19.75	-10.70%	-15.70%	-14.00%	-4.70%
Healthcare Support	\$9.50	-8.00%	-16.20%	-13.60%	-9.00%
Installation, Maintenance, and Repair	\$15.36	-16.90%	-22.30%	-26.80%	-14.80%
Legal Occupations	\$27.34	-23.30%	-32.00%	-12.80%	-9.80%
Life, Physical, and Social Science	\$20.72	-13.10%	-30.70%	-0.20%	-7.90%
Management	\$29.47	-16.20%	-15.90%	-25.90%	-7.30%
Office and Administrative Support	\$11.61	-19.70%	-17.20%	-21.20%	-6.40%
Personal Care and Service Occupations	\$8.04	-13.20%	-16.00%	-15.10%	1.00%
Production Occupations	\$11.24	-12.30%	-25.60%	-14.70%	-20.90%
Protective Service Occupations	\$12.82	-2.70%	-6.20%	-14.70%	17.20%
Sales and Related	\$9.33	-12.50%	-13.10%	-17.00%	-13.70%
Transportation and Material Moving	\$10.55	-14.70%	-17.00%	-10.50%	-13.30%

### *Evidence from the Current Population Survey*

In order to determine other potentially significant factors affecting wage rates, data on weekly earnings, and various factors<sup>7</sup> which were hypothesized to significantly contribute to an individual's wage were gathered from the 2000 Current Population Survey. A reduced-form model was constructed and estimated in order to predict weekly earnings based on these variables. Results of the final model can be found in Appendix B. These findings indicate that being employed in a small southern MSA or in the rural south does have a significant impact on wages. Specifically, after accounting for all other factors, being employed in a small southern MSA contributes to a \$62.96 reduction in weekly earnings. These results indicate that geographic factors do indeed have a significant impact on earnings, however at the same time they do not rule out the possibility of additional (unobservable) factors also contributing to the existing wage gap, nor do they specify the basis for lower wages across these small southern MSAs. One hypothesis may be that there is a general lack of high-wage industries across small southern MSAs which contributes to the lower than average wages observed in these regions. This hypothesis will be considered in more detail throughout the study.

In attempts to determine how much of the Northwest Florida wage gap can be attributed to its geographic location, and how much can be attributed to other factors, the following experiment was constructed. First, weekly earnings for each occupation were calculated based on national median wage rates and an average workweek of 34.5 hours<sup>8</sup>. Then the weekly earnings for an individual in a small southern MSA were calculated by taking the U.S. weekly earnings and subtracting the small southern MSA regression coefficient of \$62.96. The percent

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<sup>7</sup> These variables included age, education, race, marital status, union status, # hours worked, part-time or full-time status, geography, industry dummies, occupation dummies, quality of life indices, job tenure and previous employment.

<sup>8</sup> This is the average number of hours worked across industries for 2001 as reported by the Bureau of Labor Statistics.

that wages decline due to being located in a small southern MSA is then labeled the percent of the wage gap which can be attributed to geographic factors. The remaining portion of the initial wage gap is then attributed to other factors. Results are shown in Table 7 below.

Table 7  
The Relationship Between Regional Wage Differences and The Small Southern MSA Effect

	<b>median wages above or below US average</b>	<b>gap due to small southern MSA</b>	<b>gap due to other factors</b>	<b>median wages above or below US average</b>	<b>gap due to small southern MSA</b>	<b>gap due to other factors</b>
	<b>Pensacola</b>			<b>Fort Walton Beach</b>		
<b>1999</b>	<b>-10.40</b>	<b>-13.70</b>	<b>3.40</b>	<b>-14.60</b>	<b>-12.70</b>	<b>-1.90</b>
<b>2000</b>	<b>-11.30</b>	<b>-11.70</b>	<b>0.40</b>	<b>-13.70</b>	<b>-11.70</b>	<b>-2.00</b>
	<b>Panama City</b>			<b>Tallahassee</b>		
<b>1999</b>	<b>-14.00</b>	<b>-13.40</b>	<b>-0.60</b>	<b>-4.70</b>	<b>-13.80</b>	<b>9.10</b>
<b>2000</b>	<b>-12.30</b>	<b>-11.70</b>	<b>-0.60</b>	<b>-6.70</b>	<b>-11.70</b>	<b>5.00</b>

Two simulations have been conducted to help put the \$62.96 estimate in context. In each, the size of the Pensacola retail trade sector is reduced and these jobs are replaced, in equal proportions, with jobs in communications and a professional-services catchall that includes engineering and consulting. Since Pensacola’s retail industry accounts for 23.3 percent of private sector employment – versus a U.S. metropolitan norm of 19.5 percent -- the first simulation is used to reduce ½ of the Pensacola retail surplus and the second is used to eliminate the surplus. These represent hypothetical transfers of 3091 and 6181 jobs (respectively) away from retail trade.

The effect of this structural change on the area wage gap, however, is very small (Table 8). For example, eliminating all of the retail surplus increases the relative wage from 91.3

percent of the national average to 92.3%. In other words, the \$62.96 cannot be significantly reduced by a large shift in the types of jobs alone.

**Table 8**  
**Wage Effect from Decreasing the Pensacola Retail Employment Surplus**

Item	Eliminate 1/2 Retail Surplus Employment	Eliminate All of the Retail Surplus
Private	163,613	163,613
Retail Trade	38,086	38,086
Retail Share of Private Employment	23.3%	23.3%
Expected Retail Trade (19.5% of Private Employment)	31,905	31,905
Communications	2942	2942
Other Professional Services	4371	4371
Retail Employment Surplus Reduction	3091	6,181
New Communications	1,545	3,091
New Other Pro Services	1,545	3,091
<b>Model Results</b>		
Average Wage	\$664.00	\$664.00
Small South Effect	-62.956	-62.956
Small South Mean	0.0834	0.0834
Communications Effect	\$255	\$255
Other Professional Services Effect	\$144	\$144
<b>Simulation</b>		
Controlled Wage Gap	\$63	\$63
Private Employees	163,613	163,613
Total, Controlled Wage Gap	\$10,300,420	\$10,300,420
Wages in Hypothetical Small South	\$107,779,486	\$107,779,486
Wages Elsewhere	\$118,079,906	\$118,079,906
<b>Existing Wage Gap (%)</b>	<b>91.3</b>	<b>91.3</b>
Wage Boost from New Communications Workers	\$394,338.08	\$788,931.39
Wage Boost from New Other Pro Services	\$222,331.68	\$444,807.26
Total Wages With Wage Boost	\$108,396,155.89	\$109,013,224.78
<b>Simulation Wage Gap (%)</b>	<b>91.8</b>	<b>92.3</b>

## Appendix A

### Matched Pairs Tests with Cost of Living Adjustment

An attempt is also made while doing this analysis to account for the understanding that the value of a dollar is not equal in all parts of the country. Thus there could be difficulty in deciding how much, if any, of the wage gap may be pure or simply due to the higher value of the dollar in Northwest Florida when compared to the nation at large. Different indices and sources give different values of the cost of living in the various Northwest Florida MSA's compared to the entire United States. Even more importantly, strong disagreement exists on the appropriateness of adjusting wages in different areas by using the cost of living index estimates of said areas. The general belief among scholars is that while it is overestimating the value of higher wages in larger cities to not adjust for the higher costs of living in those cities, it is also *underestimating* the increased wages in these cities to directly adjust by using the ACCRA cost of living index (DuMond, Hirsch, and Macpherson, 1999). Because the local MSA's, with the exception of Tallahassee, have ACCRA indices less than 100 (that is, the cost of living is measured to be less than the national average) we feel that it is a conservative approach to adjust these MSA median wage estimates by the ACCRA figures and compare these adjustments to the national median wages by sector. If anything this should underestimate the importance of the higher wages in the U.S. as a whole, and our tests to investigate the significance of the wage gap will not have as much statistical power as they otherwise might. In truth, some adjustment similar to cost of living are probably necessary but a full adjustment by the ACCRA numbers most likely makes the wage gap look smaller than it effectively is.

The raw data certainly seem to indicate that pure wages in the Pensacola MSA are almost unilaterally lower than in the nation at large. After adjusting by using the ACCRA index, the

Pensacola MSA still demonstrates lower wages, by sector, than the national medians. Using Pensacola's approximate 1999 ACCRA index of 96.9, each field of employment's wages was adjusted to account for lower living costs in the Pensacola area. After these adjustments, only three of the twenty employment sectors listed showed the Pensacola median wage to be higher than the U.S. median wage (education & library, protective services, and management occupations). The Pensacola median annual earnings were approximately \$3,300 lower than the national median annual earnings (again, properly weighted). A Wilcoxon Rank Sum test was conducted after adjusting the Pensacola median wage data by 90%. That is, to take an even more conservative approach than adjustment by ACCRA, we assumed the cost of living in Pensacola to be only 90% of the national cost of living. Again, ACCRA estimates for 1999 indicated a cost of living adjustment of approximately 96.9%, so this approach was rather conservative. Nevertheless, we were still able to reject the contention that the Pensacola MSA's wages were equal to national standards with a p-value of 0.0233.

The Fort Walton Beach MSA has twenty reported industrial sectors. After the data has been adjusted using the ACCRA value of 99.8 as the cost of living index in Fort Walton Beach, the results are almost identical (not surprising considering the approximation of 99.8% of the national average cost of living). After adjustment, the same three employment sectors exhibited higher wages in the Fort Walton Beach MSA than in the general U.S. The adjusted annual median income in Fort Walton Beach was again, approximately \$4,860 lower than in the United States. After using the same 90% cost of living adjustment that was adopted for the Pensacola matched pairs tests, we received a p-value of 0.01539 – strong evidence that wages are genuinely lower in Fort Walton Beach, especially when we consider that adjusting by the ACCRA value of 99.8% would still be considered a safe, conservative adjustment.

Panama City was also analyzed with reference to the United States as a whole. After adjustment by the ACCRA cost of living estimate of 96.3% of the national cost of living, Panama City still reported a median raw annual income of \$3,800 less than the national figure. Once again, the matched pairs test was conducted after adjusting the Panama City wages as if the cost of living there was only 90% of the average national cost of living. This rather conservative test still resulted in strong evidence that the median wage in Panama City is below national standards (with a p-value of 0.0022).

The Tallahassee MSA has some differences from the other three Northwest Florida cities. Only seventeen of the potential twenty-two employment fields were represented in the Tallahassee data. The ACCRA cost of living adjustment actually indicated that the cost of living in Tallahassee was higher than the national average cost of living. The ACCRA index value of 109 indicates that the cost of living is actually 9% higher in Tallahassee than nationally. Concern exists that adjusting for this index will make wages in Tallahassee appear artificially lower than national standards (since using ACCRA figures to adjust wages is reported to overcorrect and give an impression that the wages are effectively even higher in areas with higher living costs than they truly are). However, for reporting purposes, it can be noted that after adjustment by the ACCRA figures, a wage gap estimate of \$3,180 exists for comparison of Tallahassee to the United States. Because the data strongly suggests that cost of living is higher in Tallahassee than in any of the other three Northwest Florida MSAs under consideration, we did not adjust the Tallahassee wages by 90%. We did conduct the matched pairs test after adjusting the Tallahassee wages as if the cost of living in Tallahassee was 95% of the national average. Since every indication is that the cost of living in Tallahassee is actually *above* 100% of the national cost of living, this matched-pairs test is, again, very conservative. We still receive a p-value of 0.04746 when we test as if Tallahassee has this blatantly low cost of living.

Thus, in Tallahassee, we again have strong evidence of the existence of a wage gap. Because there was no figure for cost of living in all of Florida, exact adjustments couldn't be made to more accurately run the matched pairs test on the state level, however intuitively it appears that wages are lower in Tallahassee than in the state of Florida after the consideration of the value of the dollar in Tallahassee.

**Results of wage determination model:**

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701 <sup>a</sup>	.492	.490	342.5165

a. Predictors: (Constant), JOB TENURE (NUMERIC), OCCUP =FARM, Rural SOUTH, INDUSTRY=COMM, OCCUP=HH, OCCUP =TECHNICIAN, INDUSTRY=MINING, INDUSTRY =WHOLESALE, INDUSTRY=SOCIAL SERV, OCCUP =PROTECTIVE, INDUSTRY=UTILITIES, small MSA SOUTH, INDUSTRY=TRANS, OCCUP =HANDLERS, RACE - black, INDUSTRY=AUTO REP/SERV, OCCUP =MACHINE, INDUSTRY=OTHER PROF SERV, PT/FT, INDUSTRY=HOSPIT, MARITAL STATUS, INDUSTRY=CONSTR, INDUSTRY=MEDICAL, MIDWEST, OCCUP=ADMIN, UNION, INDUSTRY =FINANCE, INSUR, REAL ESTATE, AGE^2, OCCUP =TRANSP, INDUSTRY=NONDUR MANUF, OCCUP =SERVICE, INDUSTRY=EDUC, SEX, OCCUP=SALES, INDUSTRY=PUBLIC ADMIN, EDUC, INDUSTRY=DUR MANUF, OCCUP =CRAFT, HRS WORKED, AGE

ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.20E+09	40	29995049.46	255.674	.000 <sup>a</sup>
	Residual	1.24E+09	10566	117317.533		
	Total	2.44E+09	10606			

a. Predictors: (Constant), JOB TENURE (NUMERIC), OCCUP =FARM, Rural SOUTH, INDUSTRY=COMM, OCCUP=HH, OCCUP =TECHNICIAN, INDUSTRY=MINING, INDUSTRY =WHOLESALE, INDUSTRY=SOCIAL SERV, OCCUP =PROTECTIVE, INDUSTRY=UTILITIES, small MSA SOUTH, INDUSTRY=TRANS, OCCUP =HANDLERS, RACE - black, INDUSTRY=AUTO REP/SERV, OCCUP =MACHINE, INDUSTRY=OTHER PROF SERV, PT/FT, INDUSTRY=HOSPIT, MARITAL STATUS, INDUSTRY=CONSTR, INDUSTRY=MEDICAL, MIDWEST, OCCUP=ADMIN, UNION, INDUSTRY =FINANCE, INSUR, REAL ESTATE, AGE^2, OCCUP =TRANSP, INDUSTRY=NONDUR MANUF, OCCUP =SERVICE, INDUSTRY=EDUC, SEX, OCCUP=SALES, INDUSTRY=PUBLIC ADMIN, EDUC, INDUSTRY=DUR MANUF, OCCUP =CRAFT, HRS WORKED, AGE

b. Dependent Variable: WEEKLY EARNINGS

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2443.235	80.742		-30.260	.000
	AGE	17.707	1.700	.457	10.415	.000
	AGE^2	-.164	.020	-.356	-8.247	.000
	EDUC	47.962	1.682	.252	28.522	.000
	MARITAL STATUS	36.650	7.492	.037	4.892	.000
	RACE - black	-42.948	11.580	-.026	-3.709	.000
	SEX	160.191	7.851	.167	20.404	.000
	UNION	71.252	10.533	.051	6.765	.000
	HRS WORKED	15.936	.489	.354	32.592	.000
	PT/FT	43.502	14.083	.033	3.089	.002
	MIDWEST	-26.685	8.024	-.024	-3.326	.001
	Rural SOUTH	-91.428	13.065	-.050	-6.998	.000
	small MSA SOUTH	-85.244	14.190	-.043	-6.007	.000
	INDUSTRY=MINING	223.216	44.848	.035	4.977	.000
	INDUSTRY=CONSTR	121.766	18.249	.057	6.673	.000
	INDUSTRY=DUR MANUF	140.457	15.064	.085	9.324	.000
	INDUSTRY=NONDUR MANUF	122.527	16.469	.063	7.440	.000
	INDUSTRY=TRANS	113.771	18.921	.050	6.013	.000
	INDUSTRY=COMM	247.385	28.711	.063	8.616	.000
	INDUSTRY=UTILITIES	192.953	31.953	.044	6.039	.000
	INDUSTRY =WHOLESALE	74.906	18.858	.030	3.972	.000
	INDUSTRY =FINANCE, INSUR, REAL ESTATE	141.413	15.358	.076	9.208	.000
	INDUSTRY=AUTO REP/SERV	135.078	16.478	.065	8.197	.000
	INDUSTRY=HOSPIT	58.066	18.518	.025	3.136	.002
	INDUSTRY=MEDICAL	63.597	17.757	.029	3.582	.000
	INDUSTRY=EDUC	-38.143	14.668	-.024	-2.600	.009
	INDUSTRY=SOCIAL SERV	-53.340	22.413	-.018	-2.380	.017
	INDUSTRY=OTHER PROF SERV	130.001	18.093	.058	7.185	.000
	INDUSTRY=PUBLIC ADMIN	69.075	17.740	.034	3.894	.000
	OCCUP =TECHNICIAN	-123.321	18.068	-.051	-6.826	.000
	OCCUP=SALES	-107.474	13.228	-.071	-8.125	.000
	OCCUP=ADMIN	-214.036	11.257	-.162	-19.014	.000
	OCCUP=HH	-142.760	44.995	-.023	-3.173	.002
	OCCUP =PROTECTIVE	-214.336	27.432	-.060	-7.813	.000
	OCCUP =SERVICE	-200.539	13.963	-.126	-14.362	.000
	OCCUP =CRAFT	-192.596	14.476	-.123	-13.305	.000
	OCCUP =MACHINE	-271.793	18.204	-.129	-14.931	.000
	OCCUP =TRANSP	-278.101	20.422	-.109	-13.618	.000
	OCCUP =HANDLERS	-258.635	20.469	-.099	-12.636	.000
	OCCUP =FARM	-245.520	30.823	-.059	-7.965	.000
	JOB TENURE (NUMERIC)	1.877	.337	.041	5.573	.000

a. Dependent Variable: WEEKLY EARNINGS

## Appendix B

### Results of wage determination model:

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701 <sup>a</sup>	.492	.490	342.5165

- a. Predictors: (Constant), JOB TENURE (NUMERIC), OCCUP = FRAM, Rural SOUTH, INDUSTRY = COMM, OCCUP = JJ, OCCUP = TECHNICIAN, INDUSTRY = MINNING, INDUSTRY = WHOLESALE, INDUSTRY = SOCIAL SERV, OCCUP = PROTECTIVE, INDUSTRY = UTILITIES, small MSA SOUTH, INDUSTRY = TRANS, OCCUP = HANDLERS, RACE- black, INDUSTRY = AUTO REP/SERV, OCCUP = MACHINE, INDUSTRY = OTHER PROF SERV, PT/FT, INDUSTRY = HOSPIT, MARTIAL STATUS, INDUSTRY = CONSTR, INDUSTRY = MEDICAL, MIDWEST, OCCUP = ADMIN, UNION, INDUSTRY = FINANCE, INSUR, REAL ESTATE, AGE ^2, OCCUP = TRANSP, INDUSTRY = NONDUR MANUF, OCCUP = SERVICE, INDUSTRY = EDUC, SEX, OCCUP = SALES, INDUSTRY = PUBLIC ADMIN, EDUC, INDUSTRY = DUR MANUF, OCCUP = CRAFT, HRS WORKED, AGE

#### ANOVA<sup>b</sup>

Model	Sum of Squares	df	Mean Square	F	Sig.
<b>1</b>					
<b>Regression</b>	<b>1.20E+09</b>	<b>40</b>	<b>29995049.46</b>	<b>255.674</b>	<b>.000<sup>a</sup></b>
<b>Residual</b>	<b>1.24E+09</b>	<b>10566</b>	<b>117317.533</b>		
<b>Total</b>	<b>2.44E+09</b>	<b>10606</b>			

- a. Predictors: (Constant), JOB TENURE (NUMERIC), OCCUP = FRAM, Rural SOUTH, INDUSTRY = COMM, OCCUP = JJ, OCCUP = TECHNICIAN, INDUSTRY = MINNING, INDUSTRY = WHOLESALE, INDUSTRY = SOCIAL SERV, OCCUP = PROTECTIVE, INDUSTRY = UTILITIES, small MSA SOUTH, INDUSTRY = TRANS, OCCUP = HANDLERS, RACE- black, INDUSTRY = AUTO REP/SERV, OCCUP = MACHINE, INDUSTRY = OTHER PROF SERV, PT/FT, INDUSTRY = HOSPIT, MARTIAL STATUS, INDUSTRY = CONSTR, INDUSTRY = MEDICAL, MIDWEST, OCCUP = ADMIN, UNION, INDUSTRY = FINANCE, INSUR, REAL ESTATE, AGE ^2, OCCUP = TRANSP, INDUSTRY = NONDUR MANUF, OCCUP = SERVICE, INDUSTRY = EDUC, SEX, OCCUP = SALES, INDUSTRY = PUBLIC ADMIN, EDUC, INDUSTRY = DUR MANUF, OCCUP = CRAFT, HRS WORKED, AGE

- b. Dependent Variable: WEEKLY EARNINGS

### Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std. Error	Delta		
1 (Constant)	-2443.235	80.742	.457	-30.260	.000
AGE	17.707	1.700			
Age ^2	-.164	.020	-.356	10.415	.000
EDUC	47.962	1.682	.252		
MARITAL STATUS	36.650	7.492			
Race - black	-42.948	11.580			
SEX	160.191	7.851			
UNION	71.252	10.533			
HRS WORKED	15.936	.489			
PT/FT	43.502	14.083			
MIDWEST	-26.685	8.024			
Rural SOUTH	-91.428	13.065			
small MSA SOUTH	-85.244	14.190			
INDUSTRY = MINING	223.216	44.848			
INDUSTRY = CONSTR	121.766	18.249			
INDUSTRY = DUR MANUF	140.457	15.064			
INDUSTRY = NONDUR MANUF	122.527	16.469			
INDUSTRY = TRANS	113.771	18.921			
INDUSTRY = COMM	247.385	28.711			
INDUSTRY = UTILITIES	192.953	31.953			
INDUSTRY - WHOLESALE	74.906	18.858			
INDUSTRY = FINANCE, INSUR, REAL ESTATE	141.413	15.358			
INDUSTRY = AUTO REP/SERV	135.078	16.478			
INDUSTRY = HOSPIT	58.066	18.518			
INDUSTRY = MEDICAL	63.597	17.757			
INDUSTRY = EDUC	-38.143	14.668			
INDUSTRY = SOCIAL SERV	-53.340	22.413			
INDUSTRY = OTHER PROF SERV	130.001	18.093			
INDUSTRY = PUBLIC ADMIN	69.075	17.740			

OCCUP = TECHNICIAN	-123.321	18.068
OCCUP = SALES	-107.474	13.228
OCCUP = ADMIN	-214.036	11.257
OCCUT = HH	-142.760	44.995
OCCUP = PROTECTIVE	-214.336	27.432
OCCUP = SERVICE	-200.539	13936
OCCUP = CRAFT	-192.596	14.476
OCCUP = MACHINE	-271.793	18.204
OCCUP = TRANSP	-278.101	20.422
OCCUP = HANDLERS	-258.635	20.469
OCCUP = FARM	-245.520	30.823
JOB TENURE (NUMERIC)	1.877	.337