Low, Declining, Polarizing: Job Skill in Florida*

Jim Dewey
University of Florida

Dave Denslow
University of Florida

ABSTRACT

After removing the effects of local amenities, prices, and local labor supply and demand shocks, on a wage based measure of skill Florida's average job just before the Great Recession was 3% below the nation's, down from 2% at the beginning of the last decade. Florida mimics the national pattern of wage and job polarization—the hollowing of the middle of the skill distribution coupled with strongly rising relative pay for high-skill jobs, slightly rising relative pay for low-skill jobs, and falling relative pay for mid-skill jobs. In addition, labor force participation fell more in Florida than in the U.S. over the past 30 years, and this was more pronounced at low education levels. Simultaneously, real earnings for those with low education levels fell, but less than in the rest of the nation. Florida is in the midst of a pronounced emptying of the middle of its job skill distribution in which increasing demand for workers in low-skill manual non-routine jobs is apparently outpacing increasing demand for high-skill analytical workers. The agglomeration economies exhibited by high-skill jobs and expected baby boom retirements are likely to accelerate this process absent aggressive and urgent public investment in education and infrastructure, which seems unlikely.

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1. INTRODUCTION

Florida has a disproportionate share of relatively low wage jobs, largely as a consequence of its dependence on retirees and tourism. Providing pleasant vacations and retirements is an important role, but the lack of high-skill jobs means the state's most talented young men and women face a higher chance of having their skills underutilized if they want to make their careers in their home state. Those who plan to stay near home face a lower expected return on their human capital investment, and are therefore likely to invest less.

Whether because of the lack of demand for skill, its feedback to decisions to acquire human capital, low public investment in education, or a combination of all three, fewer of Florida's young people, especially young men, have college degrees relative to the national average. According to data from the 2010 American Community Survey, only 21.6% of Florida's men 25 to 34 have college degrees, compared to 27.1% nationally, to 25.3% of Florida's men aged 35-44, and to 27.9% of Florida's men aged 45-64. Florida's young women lag the nation as well, and slightly lag those ages 35-44 in Florida.

This unprecedented development—falling educational attainment among Florida's young workers—coincides with the arrival of the global knowledge economy in which ideas have more and more become the source of wealth. Recent papers show the share of workers with talent and high educational attainment is the major source of variation in economic growth across cities. (Glaeser, Ponzetto and Tobio, 2011; Glaeser and Gottlieb, 2009; Carlino, Carr, Hunt, and Smith, 2011; Abel, Gabe, Ross, and Stolarick, 2010; Abel, Dey, and Gabe, 2011; Abel and Deitz, 2009, Abel and Gabe 2010a and 2010b) College educated workers not only earn more, but increase the earnings of other workers in the city as well. College graduates who move to a city with a larger share of college graduates initially earn no more, but as they learn from others, their pay rises rapidly. College graduates attract more college graduates, and as a result cities that are knowledge centers are moving farther and farther ahead of those that are not.

Thus, high-skill jobs exhibit strong agglomeration economies that have important implications for the geographic distribution of job skill. Once the supply of highly skilled workers to a local labor market passes some threshold, that place becomes increasingly attractive to additional high skilled workers. (Moretti 20011a and 2011b) All else equal, this means locations that start with low job skill, like Florida, will become less skilled over time. Florida does, however, have one thing in its favor. The amenities that make Florida attractive to retirees and tourists are also attractive to high-skill workers—and richer workers are more willing to pay for access to them. Build a road to nowhere or a school in the middle of a desert and nothing happens. Build roads and good schools in highly desirable locations and match them with business friendly regulatory, legal, and tax systems and more high-skill jobs will come. If enough come to push some cities to a critical mass, agglomeration economies may set in and spur more high-skill job growth.

Two major trends, interacting with one another and with the agglomeration economies exhibited by high-skill jobs, are likely to push Florida's job skill lower in the near future. One of these is the coming wave of baby boomer retirements. By 2030, those 65 or older are likely to constitute 26% of Florida's population. Cities, like those in Florida, that specialize in serving retirees may be so crowded by them and the types of jobs they create that most high-skill jobs stay away. Dewey and Denslow (2012) consider the impact of baby boom retirements on Florida in more depth.

The other broad trend is labor market polarization. (Acemoglu and Autor, 2011; Autor, 2010; Autor, Katz, and Kearney, 2006) Over the past three decades, the share of workers in occupations that used to constitute the middle of the wage distribution, for example bookkeepers, declined. At the same time, relative wages grew strongly for those at the high end of the skill distribution, grew slightly for those at the low end, and fell for those in the middle. Correspondingly, real wages have risen most for those with the highest levels of education, have been stagnant for high school graduates, and have fallen for high school drop outs. In Florida, will high or low skill jobs replace those that used to make up the middle? Agglomeration economies for high-skill jobs together with the fact that Florida has historically been long on low-skill jobs and the coming baby boom retirements strongly suggest the answer is more low-skill jobs.

This paper has two related purposes. One, the subject of section 2, is to quantify the skill difference between Florida and the rest of the nation and how that skill difference changed over the last decade. The first step is to construct a wage based measure of skill by removing wage variation due to local amenities, prices, and labor shocks. By that measure, Florida's average job skill fell from about 2% below the nation's in the period from November 1998 to May 2001 (just before the recession early in the last decade) to 3% below the nation's in the period from November 2005 to May 2008 (just before the labor market disruption of the Great Recession).

The other purpose, the subject of section 3, is to document the extent and impact of labor market polarization in Florida. The national trend appears strongly in Florida—the middle of the skill distribution has hollowed out and relative pay has risen strongly at the high end and mildly at the low end, meaning it has fallen in the middle. Labor force participation fell even more in Florida than in the nation over the past 30 years, especially for those with less than a college degree. This is consistent with the hypothesis that vanishing middle-skill jobs in Florida are disproportionally replaced by low-skill jobs, for the following reason. Those with little education displaced from the middle cannot readily move up to higher-skill jobs, while those with more education displaced from the middle can more readily move to lower-skill jobs. If there is relatively less job growth at the high end, relatively more workers will move down the skill distribution, resulting in pushing more workers out of the workforce at lower education levels. At the same time, real earnings for those with low education fell substantially in Florida, but by less than in the rest of the nation. This is also consistent with the hypothesis of relatively more increase in demand for low skill jobs in Florida as polarization proceeds.

All these elements suggest the following story. As the middle of Florida's skill distribution hollows, demand for low-skill workers is outpacing demand for high-skill workers, especially relative to the nation as a whole. The agglomeration economies exhibited by high skill jobs, Florida's initially low job-skill, and expected baby boom retirements are accelerating this process and will continue to do so. Barring aggressive public investment in infrastructure and education and urgent pursuit of policies to improve the business environment, which seems unlikely, average job skill in Florida's cities will fall increasingly behind that of cities at the forefront of the knowledge economy.

2. FLORIDA'S LOW AND DECLINING JOB SKILL

2.1 Overview

Average wages in Florida were 91% of the national average based on the U.S. Bureau of

Labor Statistics' Occupational Employment Statistics (OES) wage data for May 2008. Since the OES estimates published in May are based on six semi-annual panels spanning November three years prior to May of the estimate year, the May 2008 estimates reflect conditions (November 2005 to May 2008) prior to the high unemployment of the great recession. Does this mean the average skill of Florida's workforce was 9 percentage points below the nation's at that time? Of course not. Wages vary between locations for many reasons, several of which have nothing to do with skill. It is therefore important to clarify what is meant by "low-skill" jobs, and the relation between skill and local wages.

A vast theoretical and empirical literature demonstrates wages are lower where workers find living conditions more pleasant, since workers are willing to take more pleasant living conditions, or amenities, as compensation for lower wages. Similarly, and all else equal, where the costs of goods and services (especially housing costs) are lower, workers will accept lower wages. This basic framework is known as the Rosen-Roback model (Roback, 1982 and 1988). Gyourko and Tracy (1998 and 1991), Dumond, Hirsch, and McPherson (1999), and Albouy (2008) are a few examples of the application of this framework to understanding the impacts of variations in policies and amenities on labor market conditions across cities. Glaeser (2008 and 2010) provides useful overviews. In addition to variation due to amenities and the price level, in any given year local wages will fluctuation due to local idiosyncratic shocks to the demand for or supply of various types of labor. Since it would not make sense to say an area had low-skill jobs because the workers were happy to accept low wages in exchange for good weather, beautiful beaches, and moderate housing prices, or due to temporary idiosyncratic shocks, the skill level of a job is measured largely by its national average wage.

The OES program measures occupational wages and employment for approximately 800 finely classified occupations based on the Standard Occupational Classification (SOC) system, and the data is available down to the level of Metropolitan Statistical Areas (MSA). Figure 1 (appendix) shows employment shares (in percentage points, which sum to 100) by broad occupation group for Florida from the May 2008 OES data. Management is combined with Business and Financial Operations, largely because it appears employment classifications in the OES program have shifted between these categories over time for some workers. The number in parentheses after the group title on the left is the national average wage for occupations in the group relative to the overall national average. As discussed in more detail below, average wages have been adjusted to remove the impact of variation in the share of occupations across cities, so this ratio can be thought of as the relative skill of that occupation group.

The only high-skill occupation groups where Florida has a larger than national employment share are: 1) legal occupations and 2) healthcare practitioners and technical occupations. The state economy is particularly long on relatively low-skill jobs largely related to tourists and retirees: sales, food preparation and service, and protective service. The state also has many relatively low-skill office and administrative support occupations. While the state is long on both construction occupations and installation, maintenance, and repair occupations, and these pay slightly better than average, they are associated with the low-skill, tourism and retiree growth, path. Combining information across all individual occupations indicates Florida's average job skill was 2.9% below the nation's just before the Great Recession.

2.2 A Decomposition of Relative Wages into Wage and Skill Indices

As discussed above, the average local wage is not a good indicator of the relative skill in

that location. What is needed is a measure that removes random fluctuations in local wages due to disturbances and the impact of local prices and amenities on wages. To make this more precise, Let w_{ic} be the average wage for job type *i* in location (city or state) *c* and let e_{ic} be the share occupation *i* in location *c*'s total employment. Let $\overline{w}_i$ and $\overline{e}_i$ be the national average wage and national employment share for job type *i*. Job type reflects the nature of the tasks involved and the skills required to perform them.

Consider the following decomposition of the (geometric) average local wage:

$$\frac{\prod_i w_{ic}^{e_{ic}}}{\prod_i \overline{w}_i^{\overline{e}_i}} = \frac{\prod_i w_{ic}^{e_{ic}}}{\prod_i \overline{w}_i^{e_{ic}}} \times \frac{\prod_i \overline{w}_i^{e_{ic}}}{\prod_i \overline{w}_i^{\overline{e}_i}} . \quad (1)$$

The left-hand side is the average wage in *c* divided by the national average wage. The right-hand side is obtained by first dividing and then multiplying that ratio by what average wages would be in *c* if every job in that location earned the national average wage for that occupation. The first term on the right-hand side is a relative wage index for *c* compared to the national average holding the job mix constant—the average wage in *c* divided by what it would be if the same labor mix were purchased at national prices. Of course, this first term will be heavily influenced by local amenities, prices, and shocks. The second term is an index of job skill for *c*—what the average wage would be in *c* if every job were evaluated at its national average wage, relative to the overall national average. Equation (1) is an identity decomposing local relative wages into one component reflecting local relative wages holding job type constant and one reflecting the local mix of job types holding wages constant at the national average for each job type.

Equation (1) employs geometric averaging to facilitate taking natural logs, which are easier to work with and interpret in this context. Letting $\overline{w}$ represent the overall national average wage, and noting that employment shares sum to one, so that differences in shares sum to zero, taking the natural log and subtracting $\sum_i (e_{ic} - e_i) \ln \overline{w} = 0$ from the right side gives:

$$\sum_i e_{ic} \ln w_{ic} - \sum_i \overline{e}_i \ln \overline{w}_i = \sum_i e_{ic} \left(\ln w_{ic} - \ln \overline{w}_i \right) + \sum_i \left(e_{ic} - \overline{e}_i \right) \left(\ln \overline{w}_i - \ln \overline{w} \right) . \quad (2)$$

The second term on the right hand side is a job skill index, expressed in log form. Subtracting $\ln \overline{w}$ from $\ln \overline{w}_i$ is done to ease interpretation, so the national average wage in each job is considered relative to the overall national average wage. Put differently, each location's differential share in each job is weighted by the log of the relative national average skill in that job, as measured by national average wages.

Since relative employment composition varies across space, the average worker for each job type will represent a different composite location, and therefore a different comparison bundle of amenities and housing prices. This means the national average wage for each job type relative to the overall national average depends on the geographic distribution of each job type, rather than representing only the relative skill level in that occupation. What is needed is a measure of what the national average wage for each job type would be if jobs were distributed across cities according to each location's constant share of total employment. Since not all jobs are observed in each location, this set of comparison wages cannot be directly calculatred.

To operationalize this notion, the natural log of wages for each job type in each location is regressed on job and location indicator variables. The coefficients on the job indicator variables, once differenced from the employment weighted average coefficient, form an index of the skill level of each job relative to the overall average removing the impact of geographic variations in job type distributions. These normalized coefficients are denoted *LRS*, for Log Relative Skill.

The job-skill index for location *c*, $SKILL_c$, then becomes:

$$SKILL_c = \sum_i \left(e_{ic} - \bar{e}_i\right) LRS_i \,. \tag{3}$$

A given job type may boost Florida's job quality if 1) it has higher than average skill and Florida has more than the national share, or 2) Florida has less than the national share of that occupation and it has lower than average skill. Accordingly, the job skill index may change over time due either to changes in the national wage distribution or changes in employment shares relative to the nation.

2.3 Florida's Job Skill Index

To construct an index of job skill, data that breaks employment into well defined and sufficiently narrow categories that they can be considered standardized jobs is needed. An ideal data set would allow job definition by detailed tasks performed, occupation, industry, education, experience, and any number of other factors that might be relevant. No dataset exists that stratifies jobs by these multiple criteria and provides sufficiently broad coverage by to support the construction of an accurate job skill index by detailed geographic location. It is possible to stratify by industry. However, within an industry there exists a broad range of jobs. Many industries will employ accountants, finance operators, janitors, and secretaries all doing approximately the same tasks regardless of the industry they work in. Card (2005) argues that in addition to substitution between capital and labor dependent upon wages and capital costs, firms within industries appear to easily substitute towards whatever type of labor is more abundant in particular locations. Moreover, cities increasingly specialize by function, not by industry. (Puga and Duranton, 2005)

The OES wage and employment data are the best data available at frequent time intervals for this purpose. Stratifying the workforce at such a fine occupational level may provide a good definition of what constitutes a "job". For example, lawyers will all have Juris Doctorates but legal secretaries will not; school teachers will generally need to be college educated while janitors will not; carpenters will have skill requirements that construction laborers will not. Dewey, Denslow, and Lotfinia (2006) demonstrate that controlling for location and detailed occupation performs much better than controlling for location and detailed industry for this task, and captures most, but not all, of the information available with detailed individual level data including age, education, industry, occupation, gender, race, and marital and veteran status.

To generate the *LRS* for each occupation in the May 2008 OES data, the log of the average wage for each occupation in each state, 21,441 observations in total, was regressed on occupation and state indicator variables. Since the data are average wages, the regression was weighted by employment. The regression explained 97% of the variation in log average wages. Florida's job skill was 2.9 percentage points below the nation's (exponentiating the results of equation (3), subtracting 1, and multiplying by 100). Given the structure and timing of the OES data collection, this represents job skill just prior to the labor market disruption due to the Great Recession. Figure 2 (appendix) compares the job skill index for selected states. The numbers in parentheses beside state names are the 2008 rank.

The comparison states were selected to provide a useful comparison group. Nevada shares some of Florida's job structure related problems—heavy reliance on tourism in particular. The southern states are geographically nearby. Georgia and North Carolina do much better, roughly equaling the national average. If Florida aspires to attract high-skill jobs, it will have to emulate states like Massachusetts, Connecticut, Colorado, New York, New Jersey, Minnesota,

California, Delaware, New Hampshire, and Washington, at least in so far as those states have done things to grow and attract such jobs. Virginia and Maryland have among the highest skill job structures as well. They are excluded from the comparison group because, presumably, that largely reflects the influence of the nation's capital, which Florida cannot emulate. Similarly, Alaska, and Idaho to a lesser extent, have above average job skill indices for reasons Florida cannot emulate. Low tourism as a share of GDP, a low share of retirees, and high levels of education are strongly correlated with a high job skill index (Dewey and Denslow, 2012). The states ahead of Florida in Figure 2, taken as a group, spend much more per capita on both K-12 and higher education than Florida, and have smaller retiree shares.

Firms and workers ultimately choose cities in which to locate, not states. As a result, looking at job structure by state rather than city masks a great deal of place to place variation. See Denslow and Dewey (2011) for more city level analysis of Florida's job structure. For the purpose at hand, it is worth noting Florida's job skill picture looks even worse at the city level in at least two ways. First, many states with average to slightly below average skill indices nonetheless contain one or two cities that are dense and highly populous with rich labor markets and high skill indices. As a result, talented young workers who want to remain relatively close to home have good work options. For example, Georgia has Atlanta, Pennsylvania Philadelphia, Texas Dallas and Houston, North Carolina Raleigh-Durham-Chapel Hill. In Florida, only Melbourne and Tallahassee had above average skill levels over the last decade, and neither is large enough to provide opportunities for many of the state's talented youth.

Second, occupation groups that tend to concentrate disproportionately in big cities or cities with disproportionate shares of workers in the same occupation are likely most important for increasing job skill. That is because they can form the basis of a high skill cluster of export oriented jobs (jobs with produce for non-local consumption) which can fuel further skill growth due to agglomeration economies whereby skilled workers attract more skilled workers. Doctors are high-skilled, but locate with population, not with concentrations of other doctors or other skilled workers, and don't attract other skilled doctors. Neither Melbourne nor Tallahassee has high job skill for organic reasons that suggest agglomeration economies. Tallahassee had high-skill workers associated with the state government and Florida State University, and Melbourne had high-skill workers associated with Kennedy Space Center. The only occupation group with a skill index 25% or more above average and a tendency to concentrate that shows a tendency to cluster in Florida's large cities is Legal, and it is doubtful that a proclivity for litigiousness is good for attracting firms that employ high-skill workers. Business and Financial Operations also shows some clustering in Florida's large cities, likely associated at least in part with financial planning for retirees, but this pattern it is much less pronounced.

Figure 3 shows the change in the overall job skill index for the group of comparison states from the May 2001 OES data to the May 2008 OES data. Florida declined just over a percentage point. While a 1 point drop may seem small from one perspective, from another it represents a 50% widening of the gap between Florida and the U.S. over just 7 years. Given that Florida fell that much from 2001 to 2008, it seems likely the decline will be even larger as baby boom retirees arrive en masse, particularly if the state's investment in human capital continues to lag states with high job skill. All the states in the comparison group increased relative to Florida and the nation over this period—high-skill areas are pulling further ahead. In part, this reflects the agglomeration economies exhibited by high-skill jobs discussed in the introduction—high skill workers attract more high skill workers. In part it also reflects the polarization of the labor market taken up in the next section.

Low, declining, polarizing

Equation (3) embodies two basic possibilities to account for Florida's decline from 2001 to 2008. First, the share of Florida's high-skill jobs may have fallen and the share of Florida's low-skill jobs may have risen. Second, relative national wages could have risen in occupations abundant in Florida and fallen in occupations scarce in Florida. Figure 4 plots the change in the difference between Florida's share of employment in these major groups and the U.S. share from 2001 to 2008 by the occupation group's average relative pay in 2001. The figure shows—quite dramatically—that over the last decade Florida gained relative to the U.S. in low-skill jobs and lost relative to the U.S. in high-skill jobs. Florida is losing high-skill workers and gaining low-skill workers relative to the nation and, particularly, relative to states with high skill levels. High-skill workers are more and more going to states with lots of high-skill workers, which means somewhere other than Florida.

To get at changes in the national wage distribution, Figure 5 plots changes in (log) real national average occupational wages from 2001 to 2008 against the relative wage in 2001. Relative pay rose slightly for low-skill jobs, fell slightly for those in the middle, rose more strongly for high-skill jobs, and rose most strongly for the highest skill occupations. It might be tempting to say that, as a first approximation, relative pay was flat for the lower and middle parts of the skill distribution. But, since changes in employment weighted log relative occupational wages, which must sum to zero, are being measured, the increases at the high end are offset by decreases elsewhere—namely mid-skill occupations. Thus, nationally, high-skill occupations became, relatively, more high-skill from 2001 to 2008. Since Florida has a lower than average share of these jobs, and since wages fell on average for other jobs, this national shift in the relative wage distribution tended to reduce Florida's skill index. Moreover, Florida was losing share on the jobs that were increasing in relative pay, so the interaction of the wage and employment changes worked against Florida as well. This was not random bad luck—pay declining in a lot of occupations that Florida happened to have in abundance. Rather, it is part of a large and systematic shift in the labor market—polarization.

Figure 6 sorts jobs into thirds by their national average wage for both 2001 and 208 and shows the difference between the shares of those occupations in Florida and the U.S. Some "extra" low-skill jobs providing local services to retirees and tourists are perhaps inevitable in Florida, and certainly reflect an important national role. But, the extra low-skill jobs are balanced almost entirely by fewer high-skill jobs, and the shortfall is largest for the highest skill jobs. Florida's differential share of the highest skill third of jobs fell almost a full point (0.79) in just seven years. The changes from 2001 to 2008 illustrated in Figure 6 embody both changes in job shares and changes in national relative occupational wages. That is to say, some occupations that were in the top third in 2001 are no longer in the top third in 2008, largely due to polarization.

3. POLARIZATION OF FLORIDA'S LABOR MARKET

3.1 Overview of Polarization

The polarization of the U.S. labor market proceeded in two steps, beginning in the 1980s. The first step is easier to describe and explain. The average wage premium for all college graduates versus those with no more than a high school diploma, depending on how one measures, grew from around 40% in 1980 to roughly 80% today, an enormous economic and social change to take place in just over a generation. (Acemoglu and Autor, 2011) From the debate that arose about how to explain it, a consensus emerged that the major portion of the

change, perhaps 60%, was caused by new technologies. As the cost of symbolic processing fell a billion-fold, computers replaced less-skilled workers and made more-skilled workers more valuable. Another 25% was thought to be due to globalization. As low-skilled workers from China, India, and other emerging nations joined the world's market economy, the increase in the supply of less-skilled workers, acting through trade, raised the skill premium everywhere. The remaining 15% was thought to be the result of falling real minimum wages and declining union strength. (Autor, Katz, and Kearny, 2006)

Just as that was becoming the consensus, Goldin and Katz(2008) painted the picture from a different perspective. Technology had increased the demand for skilled workers, relative to the less-skilled, but supply mattered as well. Carefully developing and implementing a measure of educational attainment as it affects the productivity of workers, they estimated that historically it had risen about 3.7% a year in the United States. First there was the high school movement, then the G.I. Bill, then higher graduation rates for women. Around 1983, however, the growth of educational attainment slowed to about 2% a year, while technology continued its rapid advance. In the race between technology and education, for decades education won. After the early 1980s, that was no longer true. It was correct to say technology and trade raised the premium for skilled workers, but that was only half the story. The *change* that made the years after 1983 different was that education started losing the race.

As that more complete picture was becoming the consensus view, the labor market data were beginning to display a new feature: polarization. Autor, Katz, and Kearney (2006) provide a useful summary. Acemoglu and Autor (2011) provide a full technical treatment of polarization. Autor (2010) provides extensive empirical documentation of the polarization of the U.S. labor market over the past three decades. A new best-seller by Thomas Friedman and Michael Mandelbaum, *That Used to Be Us: How America Fell Behind in the World It Invented and How We Can Come Back*, summarizes the current understanding of polarization less technically.

Understanding polarization requires switching from thinking of two kinds of workers, skilled and unskilled, to thinking of three types of jobs, analytical, routine, and manual (non-routine). Analytical jobs require the ability to think abstractly or creatively, to communicate complex ideas clearly, and to handle fuzzy concepts—or some subset of those skills. Examples include architects, engineers, physicians, accountants, and lawyers. Routine jobs are those that can be largely replaced by software, symbolic processing, or other forms of automation. Examples include inventory control, bookkeeping, and now even searching documents for litigation. Non-routine manual tasks are those that require dexterity and have to be sensitive to a changing context. Such tasks include driving trucks through city traffic, house cleaning, cooking, and waiting tables. These jobs may require language skills. They tend to be relatively low-skill but are hard to automate. Many are personal service jobs.

As computer software and hardware have become increasing powerful, the job market has hollowed out, or polarized, in two manners. First, the share of jobs at the analytical and manual non-routine extremes has risen, while falling sharply in the middle-skill routine jobs. This may be referred to as job polarization. Second, wages have risen slightly for manual non-routine jobs, risen sharply for analytical jobs, and fallen for routine jobs. This is wage polarization, and its national pattern was reflected in Figure 5.

The distinction between workers and jobs matters because workers can switch to different types of jobs. Workers displaced from routine jobs may readily fit into many manual non-routine jobs, such as those in personal services. Without improving their skills, they would find it hard to shift to analytical jobs. Actually, the most recent literature works in terms not of *jobs* but of

tasks. That distinction is useful because software, offshoring, and trade substitute more directly for particular tasks than for particular jobs. A job is likely to involve several tasks, some of which can be easily replaced by software (organizing data) or offshoring (radiography, though there is not a lot of that off-shored). Off-shoring may substitute for tasks across the skill spectrum, in contrast to information technology, which substitutes mainly for those in the middle. (Blinder, 2009)

3.2 Polarization in Florida

This section documents the extent and nature of polarization in Florida. Much of the analysis presented here mirrors that conducted by Autor (2010) for the nation as a whole, but for Florida. There are two purposes. The first is to verify that the national phenomenon is broadly reflected in Florida. The second is to determine if there are any ways in which Florida stands out. In particular, does it appear that growth in low-skill jobs are replacing vanishing mid-skill jobs more in Florida than in the rest of the nation?

Figure 7 replicates Figure 5 for Florida wage data. Specifically, it plots changes in (log) relative occupational wages from 2001 to 2008 in Florida against their level in 2001. Relative wage changes in Florida show the same pattern seen in Figure 5, but show more variability since they are estimated on a much smaller sample. With more workers at low skill levels, particularly in non-routine manual jobs, low-skill workers in Florida gained more relative to the state average than was the national pattern—which should be expected given the interaction between polarization and the state's initial job structure. Thus, Florida fits the national pattern of wage polarization, and the impact on the low end of the skill distribution is more important for Florida.

The Current Population Survey (CPS) is a national monthly survey of about 50,000 households. The March survey asks questions about income and earnings. To provide a first look at job polarization using this data, March CPS respondents are split into groups according to whether their occupation involves predominantly analytical, routine, or personal service type manual non-routine tasks. Roughly, these are high-skill, mid-skill, and low-skill jobs. To go from detailed occupations to the categories in the chart, Autor's crosswalk is used. Because the CPS surveys only 2,500 or so households in Florida, and as averages for many occupational groups are calculated, 1998, 1999, and 2000 are pooled to represent 2000 and 2008, 2009, and 2010 are pooled to represent 2010. The CPI is used to adjust for inflation.

Figure 8 shows the (midpoint) percentage change in employment from 2000 to 2010 by job type. Employment rose 25% or more for managers, professionals, and technicians at the high end of the skill distribution, and over 40% for protective services and personal care and services at the low end. For food preparation and cleaning the gain was 15%. For routine jobs in the middle—sales, office and administration, operators, and fabricators—employment gains were well under 10%. This closely mirrors the U.S. pattern of job polarization.

Having confirmed the basic patterns of wage and job polarization for Florida, the next step is to examine these changes in more detail, particularly by education and gender. Figure 9 displays employment shares changes in low- mid- and high-skilled occupations by educational attainment for men. For all men, the share in low skill occupations rose not quite 2 points, the share in middle skill occupations fell 4 points, and the share in high skill occupations rose 2.5 points. Growth in low-skill job share is seen across all education levels. Strikingly, in Florida at least, the share of those with a four year degree or more (college+) in high-skill jobs actually fell. Figure 10 replicates Figure 9, but for women. The pattern is generally the same qualitatively and

is quantitatively stronger, except that the most educated women did not see the share of employment in the highest skill jobs fall. These changes occurred in only a decade.

Figure 11 shows the percentage point change in the employment to population ratio in Florida from 1980 to 2010 by sex and education. For this longer period, data from 1979, 1980, and 1981 are pooled to represent 1980. For men, the employment to population ratio fell in all educational categories. The declines for dropouts and for those stopping with high school diplomas were dramatic. For high school graduates, the employment to population ratio fell to 57.45% in 2008-2010, down from 72.62% twenty years before. For dropouts, the ratio fell to 35.86%, down from 49.4%. For women, workforce participation fell for the lowest education levels, but increased for those with at least some college. Relative to the national pattern shown in Autor (2010) for 1979-2007, labor force participation fell more or grew less, often by a wide margin, in Florida. The only exception being women with college degrees, whose labor force participation grew slightly more in Florida. The social and economic implications of such a large across the board drop in workforce participation, especially for males, are poorly understood. However, falling labor force participation coupled with stagnant or falling educational attainment is unattractive to firms that might bring high-skill jobs. In turn, the lack of high-skill jobs is likely to fuel further declines in human capital investment and in labor force participation, especially among those with less education.

The pattern of relatively larger declines in workforce participation at lower education levels is consistent with a stronger tendency for vanishing mid-skill jobs to be replaced by low-skill jobs rather than high-skill jobs in Florida relative to the nation. The reason this pattern might be expected is that workers displaced from the middle can move down in skill more easily than they can move to analytical jobs. Therefore, if there is relatively less growth at the high skill end of the distribution than at the low end, workers will shift down the skill distribution, with more workers with less education being pushed out of the labor force by competition from more educated workers moving down the skill distribution. So, this is further confirmation that jobs lost in the middle as Florida's workforce polarizes, have been and likely will continue to be disproportionately replaced by low-skill jobs.

Figure 12 shows real wages in Florida by sex and educational attainment for 1980 and 2010. Figure 13 shows the percentage change in real wages in Florida by sex and educational attainment from 1980 to 2010. For men, real wages stagnated over the past three decades, except for those with professional and advanced degrees. Even for college graduates (without advanced degrees) the gain was less than ten percent—an annual compound rate of less than one third of one percent per year. Wage gains for men were only substantial for those with advanced degrees. Females without college degrees showed modest real wage gains, while females with college degrees experienced substantial real wage gains. For females, the largest percentage gain was for those with a four year degree, but the largest gain in absolute terms was for those with advanced degrees.

While these findings largely mirror those reported by Autor (2010) for the nation as a whole, Florida actually fared somewhat better overall in terms of percentage real wage growth, particularly among the lower three education categories. This fits the comparison between Figures 7 and 5, which suggested stronger relative wage gains among low wage workers in Florida. This suggests the increase in demand for non-routine manual jobs due to polarization was magnified in Florida by the demands created by retirees and tourists. Those less educated workers who are indeed able to compete with the additional more educated workers pushed down toward lower skill jobs are those with relatively more skill.

These findings regarding real wage increases, for the nation and for Florida, bear careful thought. To an increasing degree wage premia are accruing to those with advanced degrees, and that is especially true for men. The causes and implications of such a change are, of course, not yet fully understood. But, they are likely to be substantial. For example, in terms of labor market outcomes, it means an increasing share of the benefits of a four year college education accrue not directly from preparing students for the labor market but from preparing them for advanced training. This has implications for the optimal design and delivery of undergraduate curriculum. Another implication is that Florida may not be able to improve its job structure much only by boosting the number graduating with four year degrees. Rather, the quality of K-12 and undergraduate programs needs to be increased to allow a corresponding increase in the quantity and quality of advanced training.

4. CONCLUSION

After removing the impact of local amenities, prices, and shocks to local wages, on a wage based measure of skill Florida's average job just before the Great Recession was 3% below the nation's, down from 2% at the beginning of the last decade. Given the agglomeration economies exhibited by high-skill workers, the low share of the state's young workers with college degrees, and the coming baby boom retirements, it is likely Florida's job skill will continue to fall.

Florida strongly displays the national pattern of wage and job polarization. As the middle of the job distribution empties out, it seems most likely the same agglomeration economies, low initial skill levels, and coming retirements that would tend to reduce job skill on their own will lead to those jobs being replaced differentially by low-skill jobs. The fact that labor force participation fell more in Florida than in the nation over the past 30 years, and that this was more pronounced at low education levels provides additional evidence consistent with this interpretation—displaced workers siding down the skill distribution boost the supply of workers to low-skill jobs and differentially push those with less education out of the workforce. In addition, real earnings for those with low education fell, but by less than the rest of the nation, further confirming this interpretation—demand at the low end is rising relative to demand at the high end more in Florida than nationally.

Florida is in the midst of a pronounced emptying of the middle of its job skill distribution. The increasing demand for workers in low-skill manual non routine jobs is apparently outpacing the increase in the demand for high-skill analytical workers, especially relative to the nation as a whole. The agglomeration economies exhibited by high-skill jobs and expected baby boom retirements are likely to accelerate this process. That, in turn, will further reduce the incentive young Floridians have to invest in high levels of human capital accumulation, further fueling this cycle.

Fighting these trends calls for public investment in infrastructure (roads, ports, airports) education (including advanced education) and pursuit of other policies to improve the business environment, for example reducing the relative tax burden on businesses, which is high in Florida despite low taxes overall taxes (Denslow and Dewey 2011). Such policies would need to be aggressive and urgent to close the gap with states that are already well ahead of Florida, as other factors will continue to push them further ahead. Barring such a course, which seems unlikely, Floridian's should prepare for a future in which Florida's job-skill falls further and further behind cities at the forefront of the knowledge economy, perhaps at an increasing rate.

More minor policies options might help at the margin. One would be to decentralize government authority as much as possible, so the impact of in-migrant retirees and tourism on areas where they dominate spills over less to other locations. This would include, for example, loosening the equalization of PreK-12public school funding to allow significant local discretion and allowing local governments more discretion in granting tax incentives to firms that compete in national, as opposed to local, markets. Another set of policies might try to induce in-migrant retirees to feel more welcomed by and connected to their adopted communities, and thus more willing to support significant spending increases on education and infrastructure. Such policies, of course, are unlikely to overcome the major forces pushing Florida's job skill level down, but they might slow them a bit in some areas of the state.

Rather than attempting to fight the forces pushing Florida's job skill down head on, perhaps the best policy response is to accept it and make the best of it. Florida will still need doctors, lawyers, and financial planners. Given increasing relative demand for manual non-routine jobs, Florida might do well to consider shifting priorities to trade schools, and train the very best landscapers, plumbers, beauticians, firemen, and policemen it can. Such a policy could raise the return to human capital investment by those who currently do not finish high school, and perhaps boost the employment to population ratio for such workers. Even Florida's best and brightest young high school graduates, if they want to work close to home, should perhaps give more serious consideration to such careers than in the past. It might more satisfying to rise to be a police or fire captain than to get a degree in mathematics or physics but to go on to be underemployed, and the odds of those with such degrees being underemployed in Florida are probably much higher now than they were 20 years ago. Whatever the course to be taken, informed decisions can be made only if the major implications of the interactions between the agglomeration economies exhibited by high-skill jobs, the coming baby boom retirements, and labor market polarization are acknowledged and understood.

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Figure 1

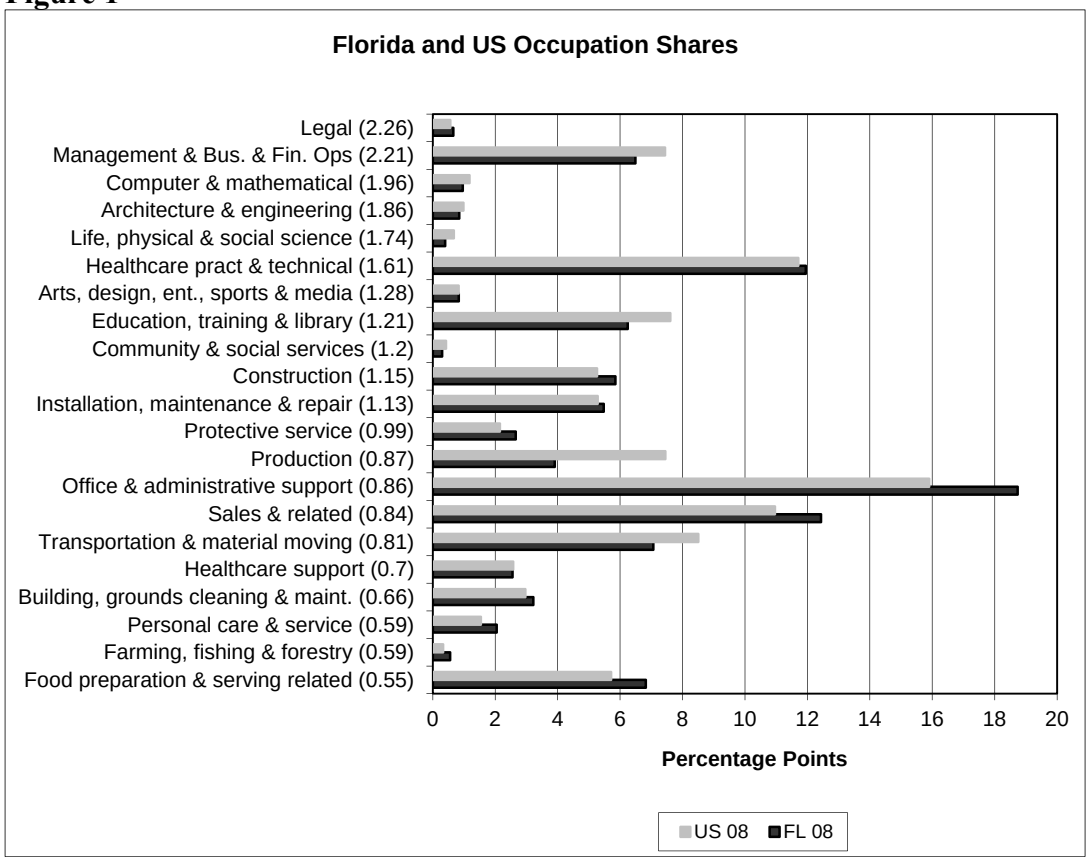
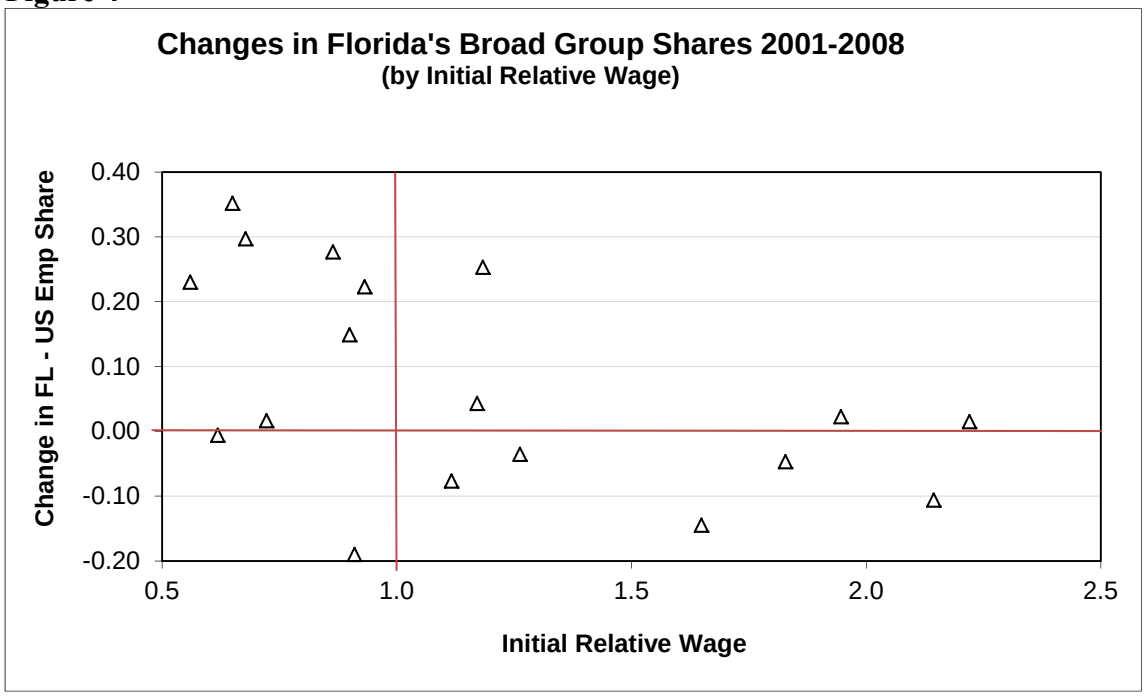


Figure 2

Low, declining, polarizing

Figure 3

Figure 4



Low, declining, polarizing

Figure 5

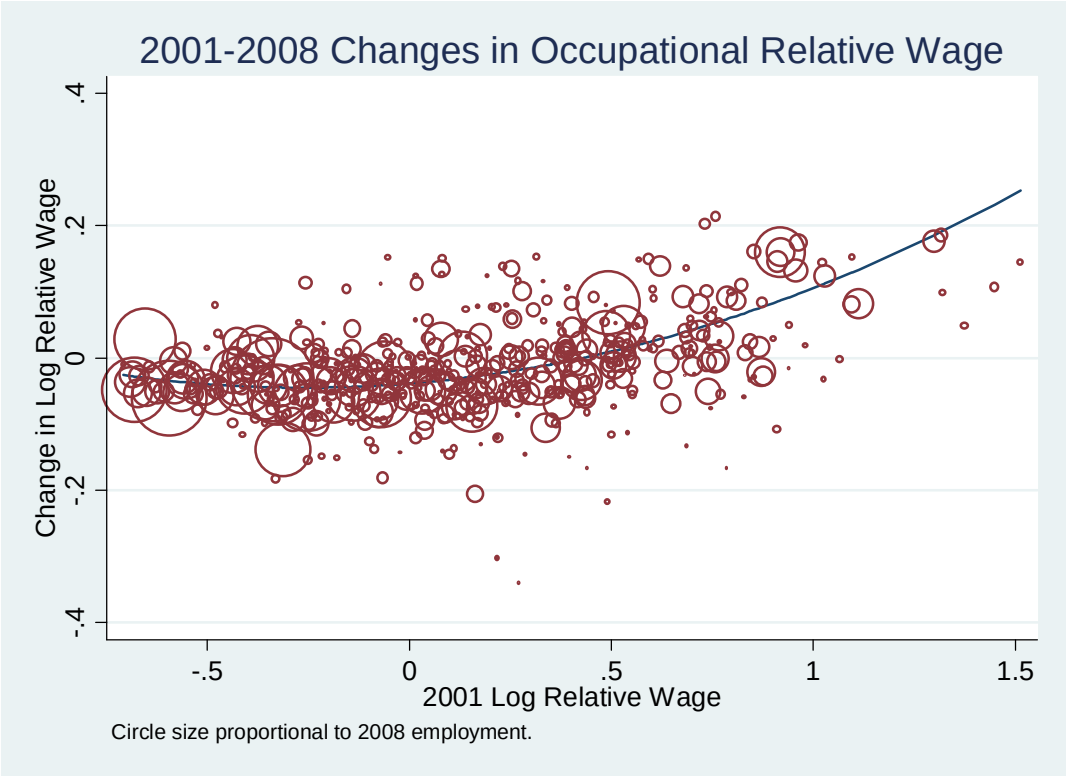
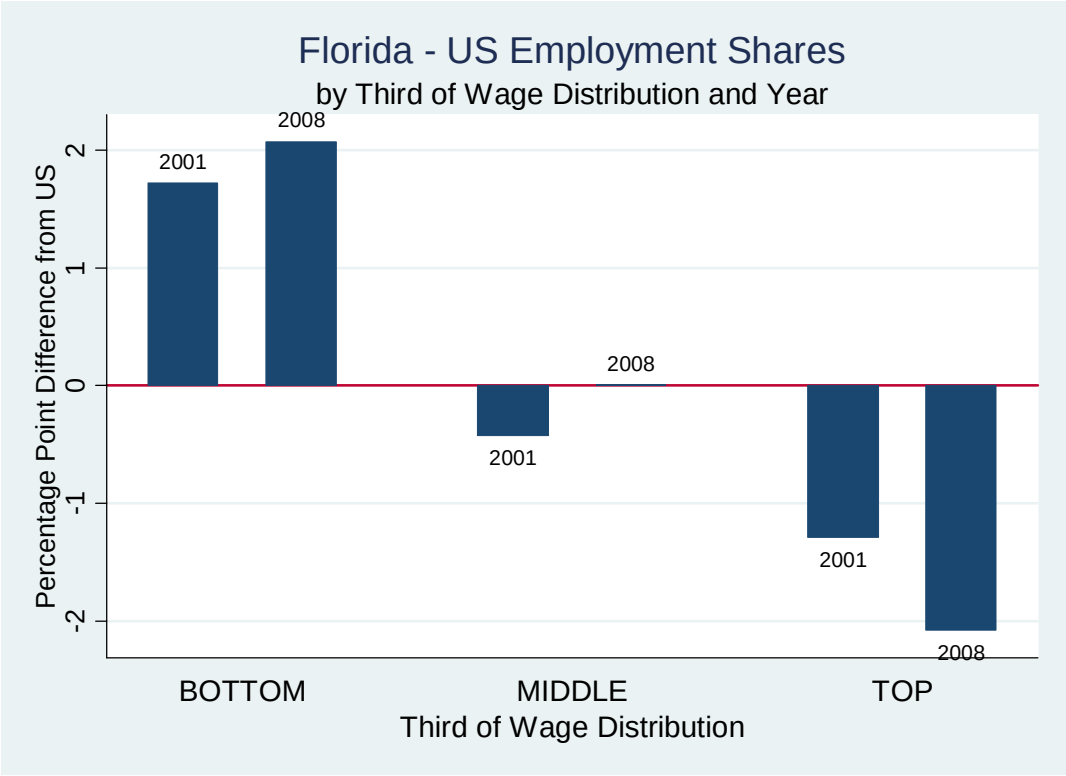


Figure 6



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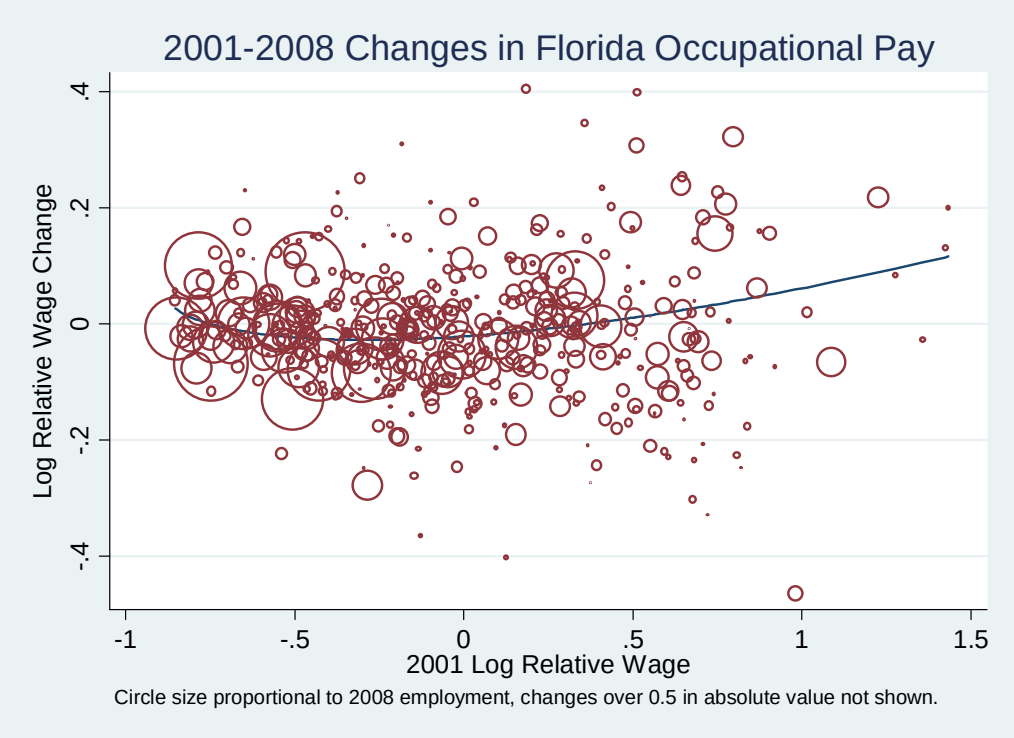

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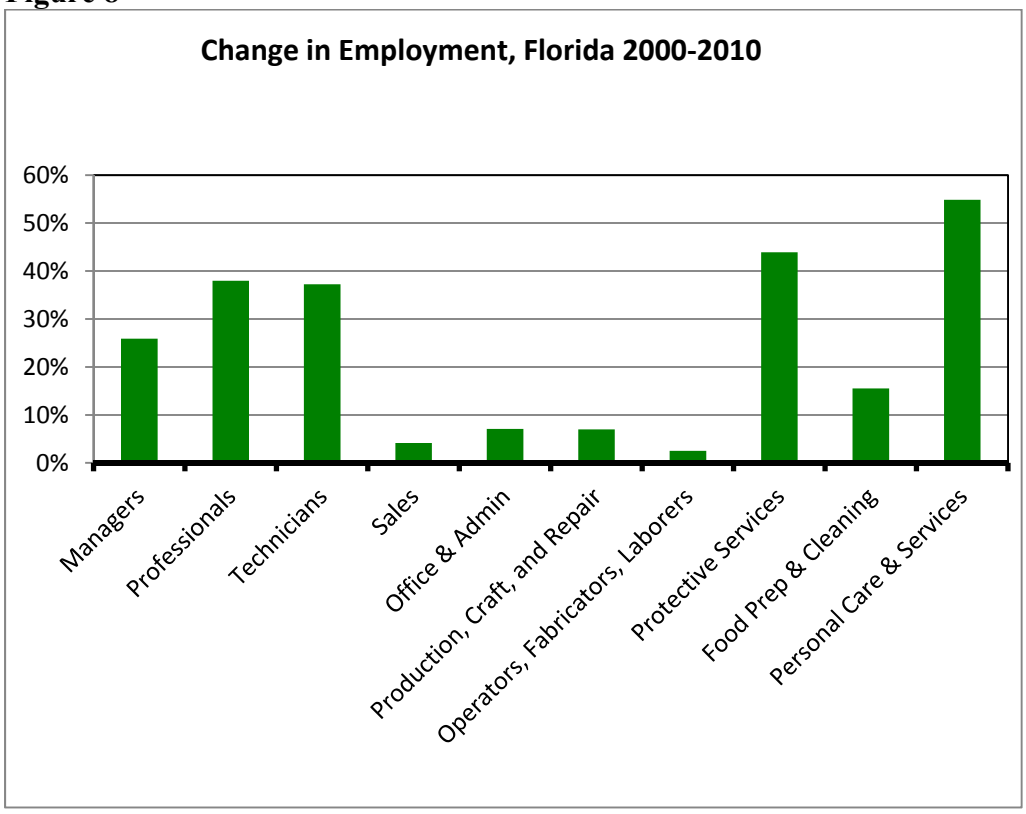
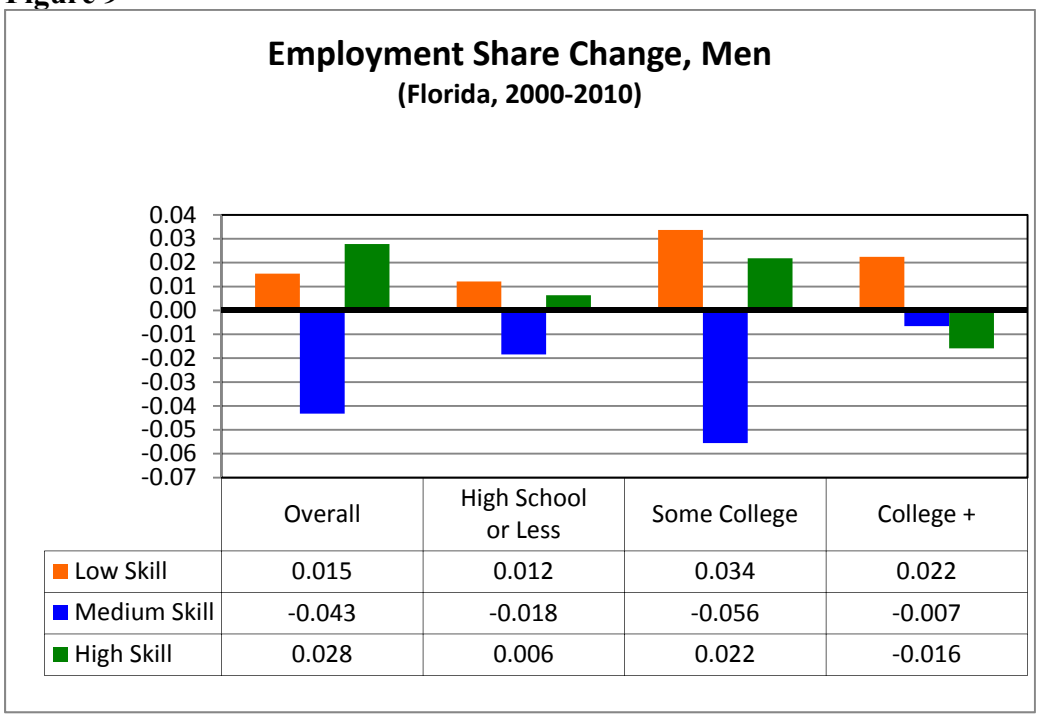


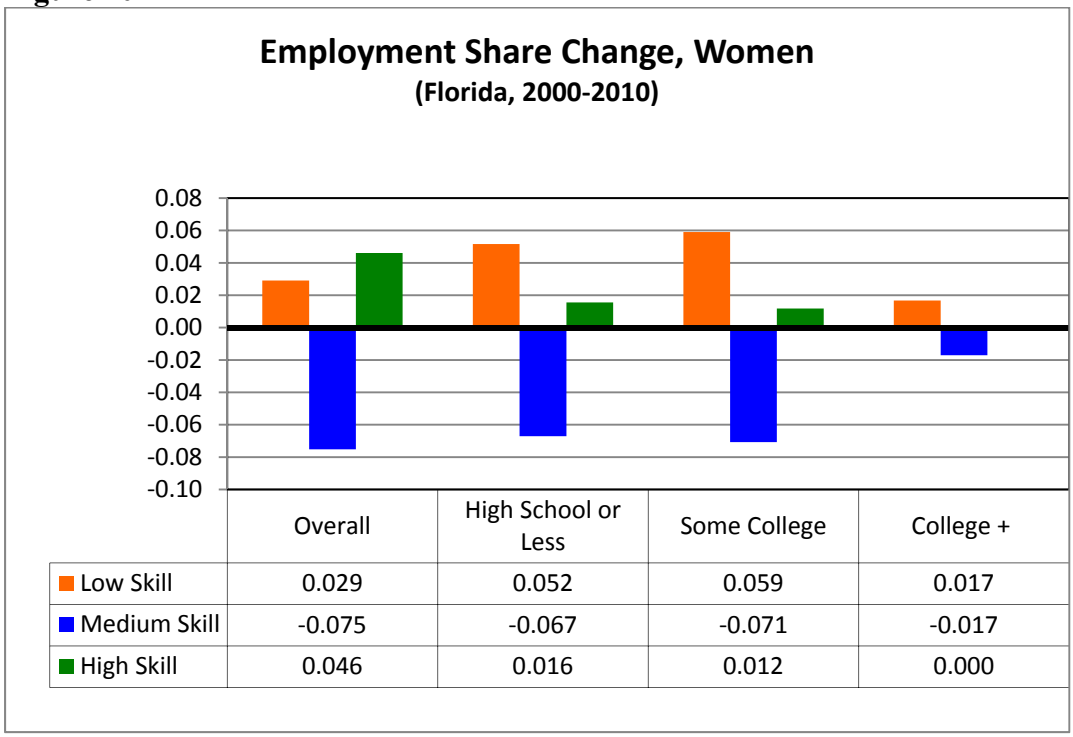
Low, declining, polarizing

Figure 9



	Overall	High School or Less	Some College	College +
Low Skill	0.015	0.012	0.034	0.022
Medium Skill	-0.043	-0.018	-0.056	-0.007
High Skill	0.028	0.006	0.022	-0.016

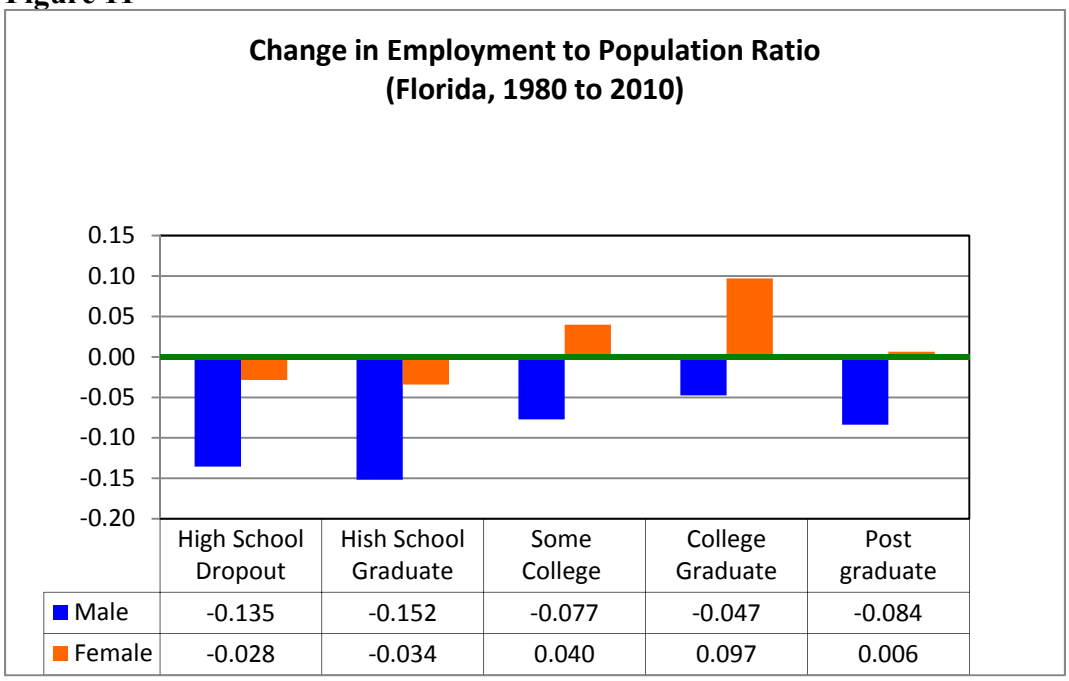
Figure 10



	Overall	High School or Less	Some College	College +
Low Skill	0.029	0.052	0.059	0.017
Medium Skill	-0.075	-0.067	-0.071	-0.017
High Skill	0.046	0.016	0.012	0.000

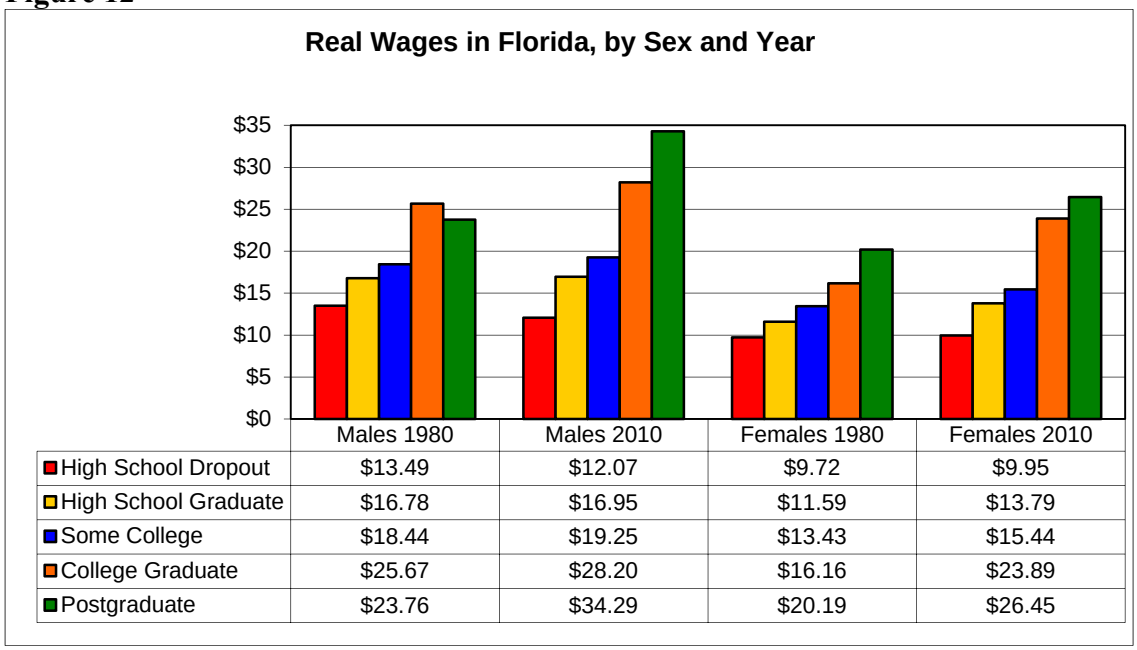
Low, declining, polarizing

Figure 11



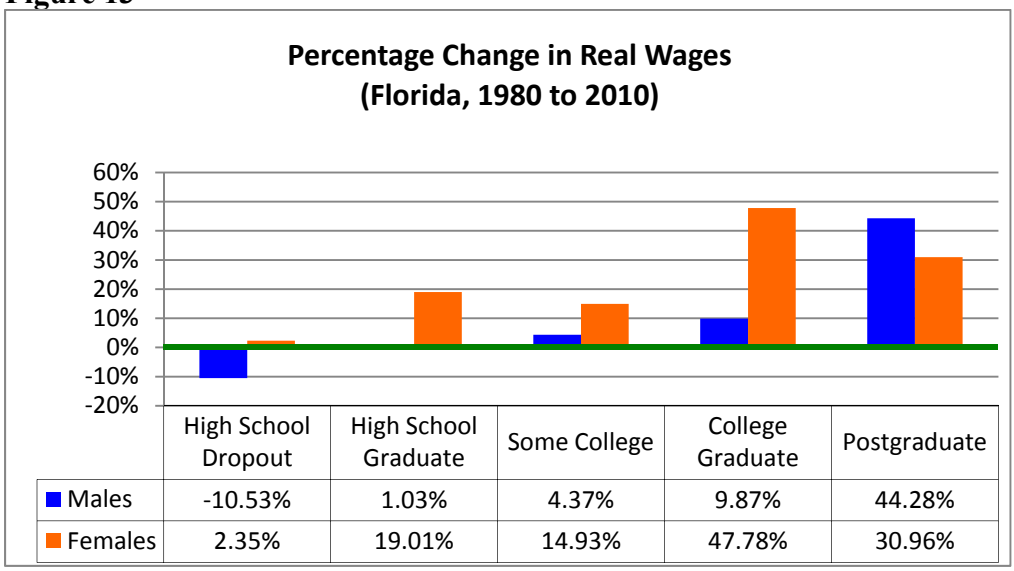
	High School Dropout	Hish School Graduate	Some College	College Graduate	Post graduate
Male	-0.135	-0.152	-0.077	-0.047	-0.084
Female	-0.028	-0.034	0.040	0.097	0.006

Figure 12



	Males 1980	Males 2010	Females 1980	Females 2010
High School Dropout	$13.49	$12.07	$9.72	$9.95
High School Graduate	$16.78	$16.95	$11.59	$13.79
Some College	$18.44	$19.25	$13.43	$15.44
College Graduate	$25.67	$28.20	$16.16	$23.89
Postgraduate	$23.76	$34.29	$20.19	$26.45

Figure 13



	High School Dropout	High School Graduate	Some College	College Graduate	Postgraduate
Males	-10.53%	1.03%	4.37%	9.87%	44.28%
Females	2.35%	19.01%	14.93%	47.78%	30.96%

Low, declining, polarizing