



## Workforce Analysis



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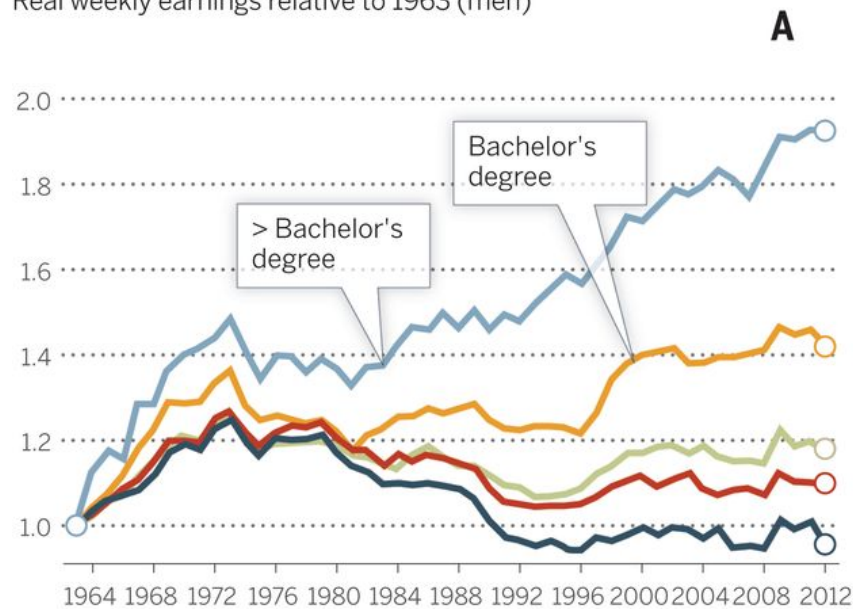
# About ADFA Economic Policy Division

- Arkansas Development Finance Authority
  - Founded 1985
  - Practice areas include housing (public housing and mortgage finance), business finance (e.g., venture capital, loan guarantees), farm mediation, selling bonds for the state, and owning/managing state government buildings
  - A top economic development agency after AEDC
- ADFA Economic Policy Division
  - Founded March 2017
  - Mission: To raise the level of a wide variety of policy conversations in Arkansas with
    - Data
    - Economic reasoning
  - Practice Areas: Workforce— especially career pathways and labor force participation, School finance, Infrastructure—especially waterways and broadband, Tax policy, Public health, and others

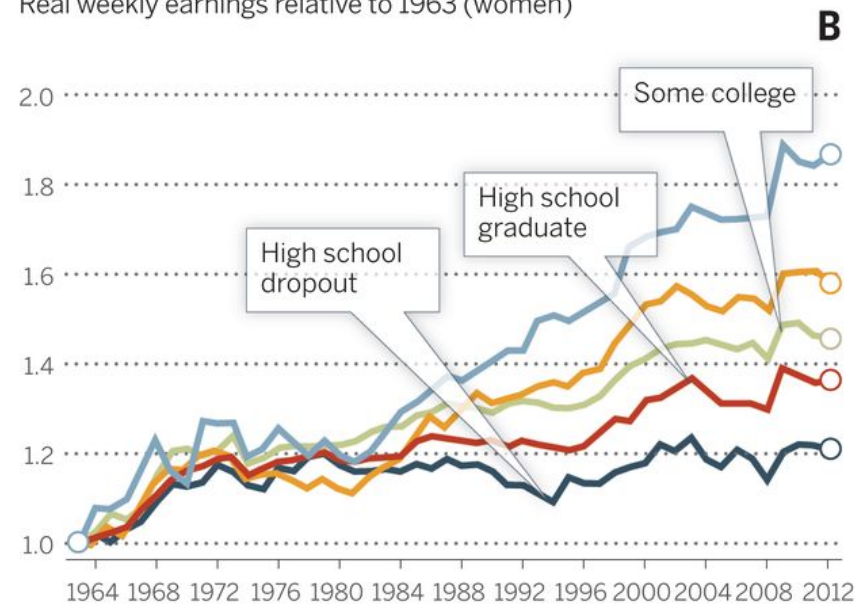
# The Growing College Premium

## Changes in real wage levels of full-time U.S. workers by sex and education, 1963–2012

Real weekly earnings relative to 1963 (men)

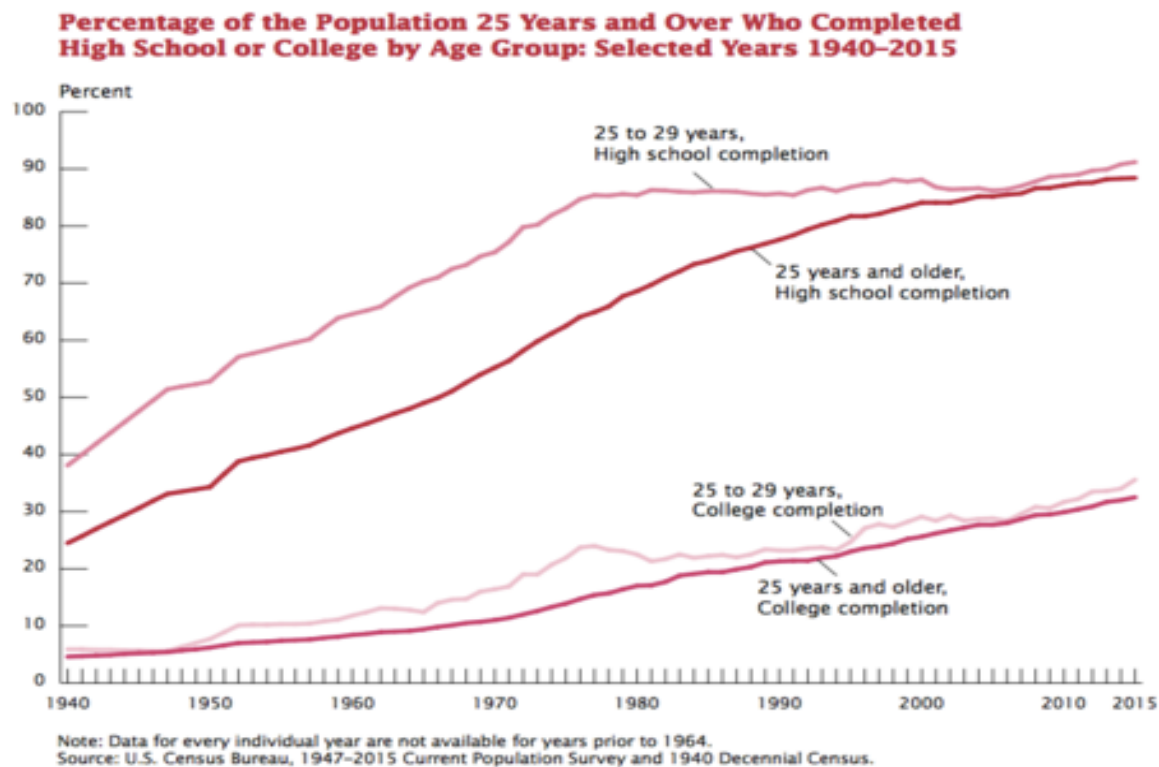


Real weekly earnings relative to 1963 (women)



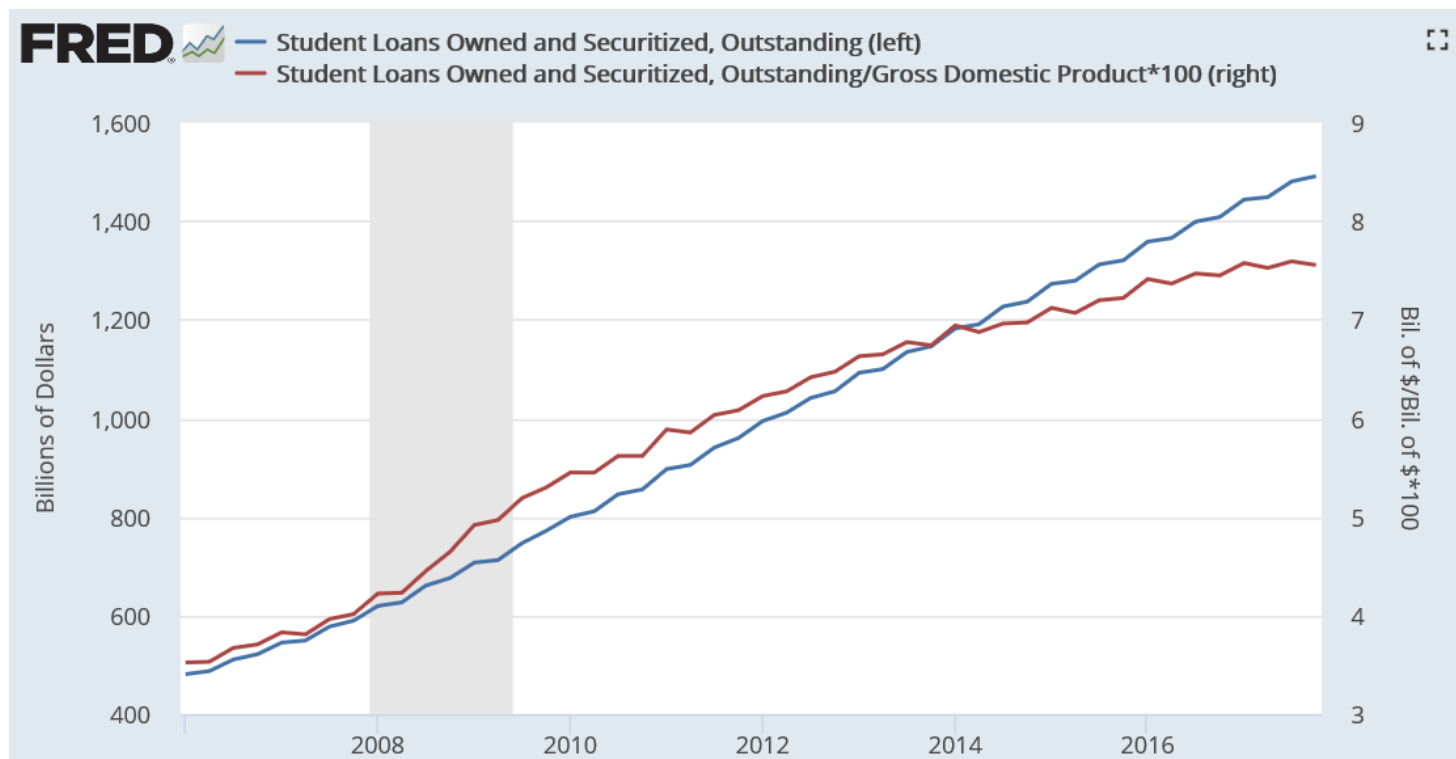
Source: David Autor. Geography: National

# College Attainment Plateaued from 1975-1995, then Has Climbed Since 2008



Source: Census Bureau. Geography: National

# The Uptick in College Attainment Has Been Accompanied by a Surge in Student Debt



Source: St. Louis Fed. Geography: National

# The Problem of Estimating Labor Market Demand for Academic Programs

- College is key to social mobility and higher earnings
  - Marriage is another (and correlated) major factor
- Reasons for the college premium
  - Human capital: education inculcates useful skills
  - Signaling: education is a way to prove talent to employers
  - Ability bias: more capable people are independently (a) more likely to earn more, and (b) more likely to go to college— even if there's no causal link
- Different reasons for the college premium imply different policy goals for higher education
  - Human capital => schools should teach what workers need to know on the job
  - Signaling => maybe schools just need to challenge people and reveal talent; a job-relevant curriculum might not matter
  - Ability bias => separation of school and state?

# The Problem of Estimating Labor Market Demand for Academic Programs

- To the extent that (a) human capital explains the college premium, and (b) to raise people's earnings is a purpose of higher education, universities should try to match academic programs with employer needs. **BUT:**
- The economy is a rich tapestry of specialization, and few if any have more than a dim grasp of the opportunities available
  - Choice of major often seems to occur with little reflection and less knowledge of the likely consequences
  - Professors may have very little idea of what their students' job prospects are, and how they might best improve them
- Education is a long-term investment, which affects career trajectories over the course of decades, and the economy is always changing
  - Today's lucrative skills may become obsolete in a few years
  - *Hiring* is especially sensitive to the *growth* of occupations and industries



# The Problem of Estimating Labor Market Demand for Academic Programs

- *Demand* for academic programs comes from:
  - Most directly, students
  - Taxpayers, who pay much of the bill for it
  - Employers, who hire the graduates
- Students are mostly in the dark about career pathways, and seem to rely heavily on universities to chart a course to success for them
  - Evidence:
    - Personal impressions as a former college student and college professor
    - Research by the Strada Educational Network, in partnership with Gallup, finds that over half of college-educated adults regret one or more educational decisions (major, institution, or degree type)
- Universities probably ought to be paternalistic in choosing what academic programs to offer, trying to direct most students to educational paths that will lead to jobs that pay well enough to support a family
  - This requires sophisticated analysis of labor market demand for graduates

# What We Can Offer

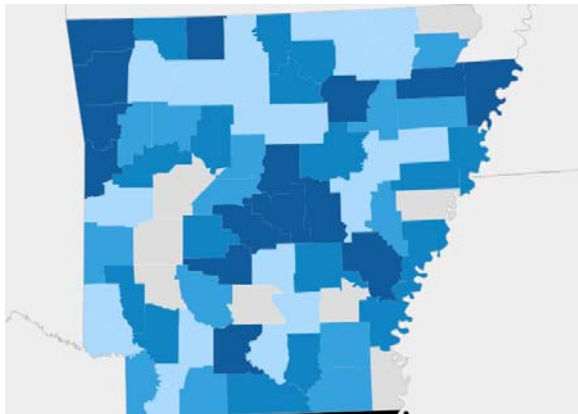
- Seeing that:
  - It's important to know what job opportunities graduates can look forward to, but
  - It's difficult for academic institutions without dedicated experts in labor market data to assess the labor market demand for graduates
- ADHE and ADFA Economic Policy Division propose to offer labor market analyses for new academic programs
- These labor market analyses will be based on:
  - Canned reports based on proprietary data available from EMSI
    - ADWS has a subscription to EMSI software
    - ADFA has been allocated one of ADWS's EMSI licenses for this purpose
  - Other data sources on an opportunistic basis
  - Analysis/narrative provided by ADFA Economic Policy Division (to avoid reports being just a "data dump")
- Deeper collaborations in program development may be explored in future

# Job Postings Data Examples

Job postings for “Writers and authors”



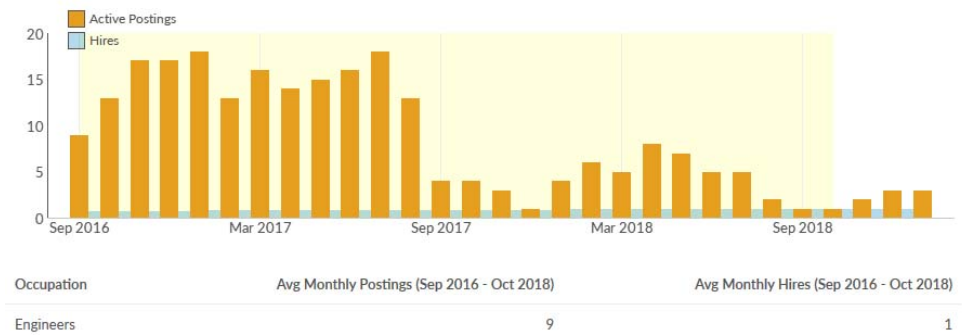
Map of job postings for software developers, applications



“Sales and related” job postings (in AR counties that are) within 60 miles of De Witt, AR

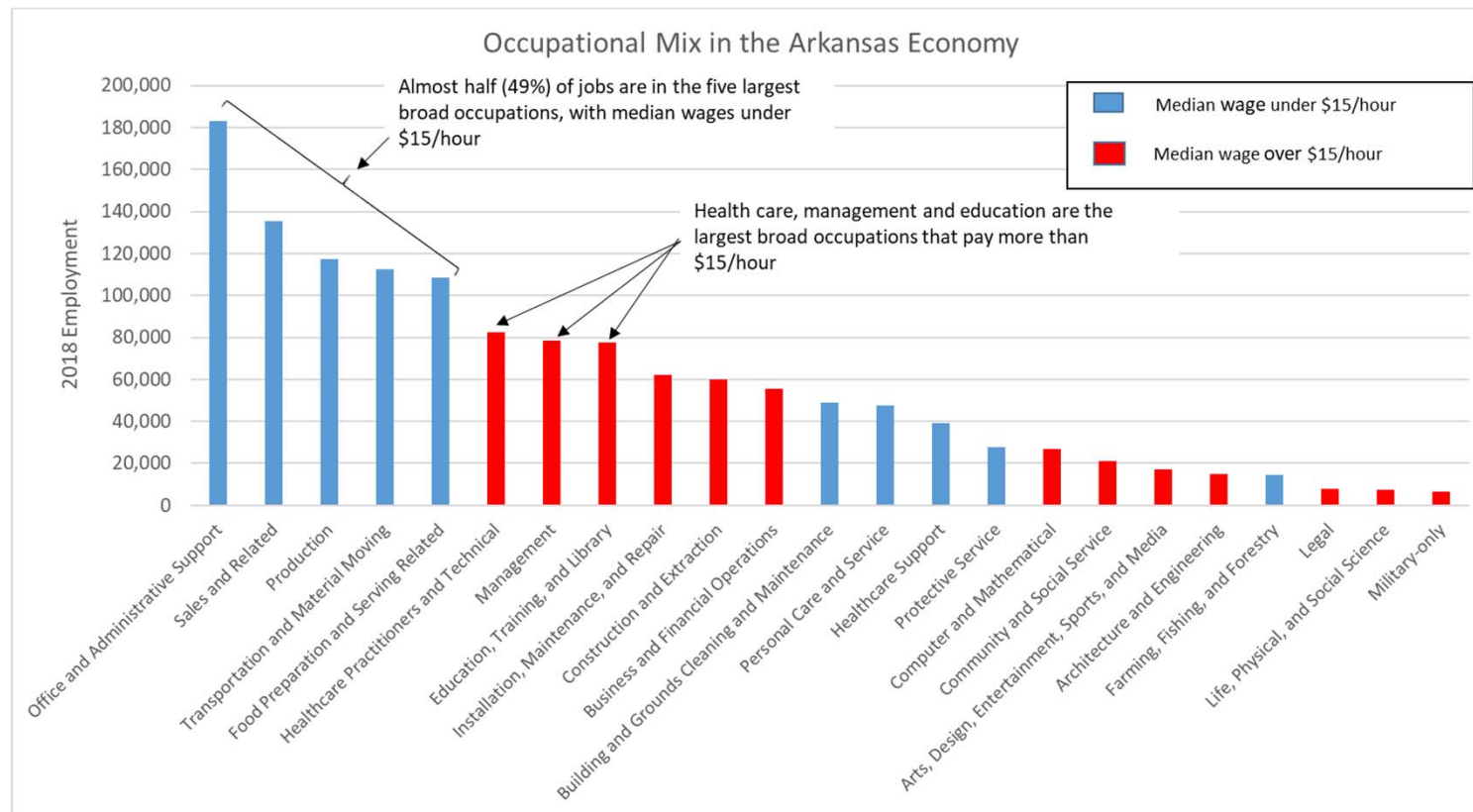


Engineers in Desha County

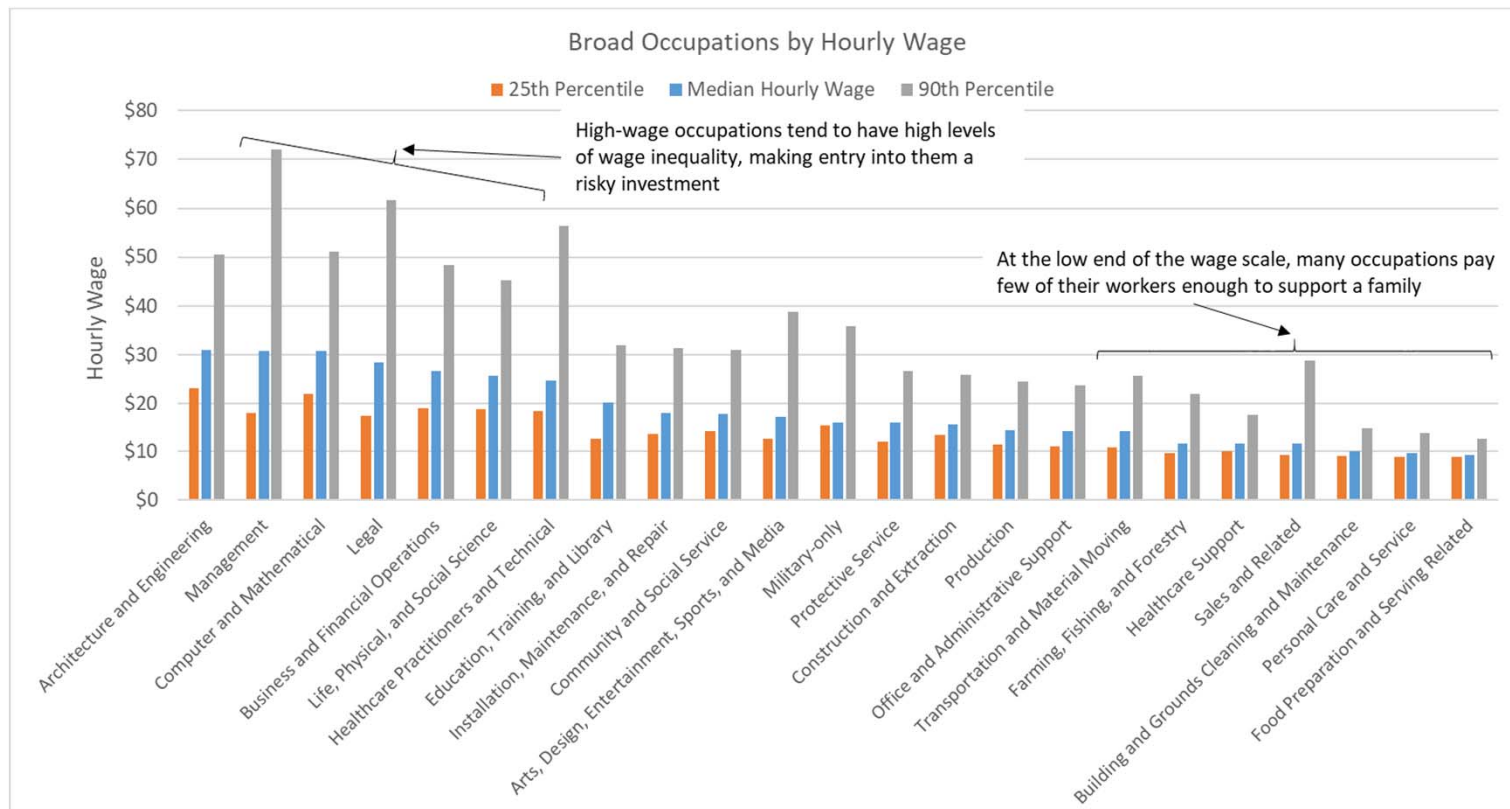


# JOBS IN ARKANSAS

## Arkansas Has a Lot of Jobs in Predominantly Low-Paid, Low-Skill Occupations, but Also Many Better-Paid and/or More Education-Demanding Jobs

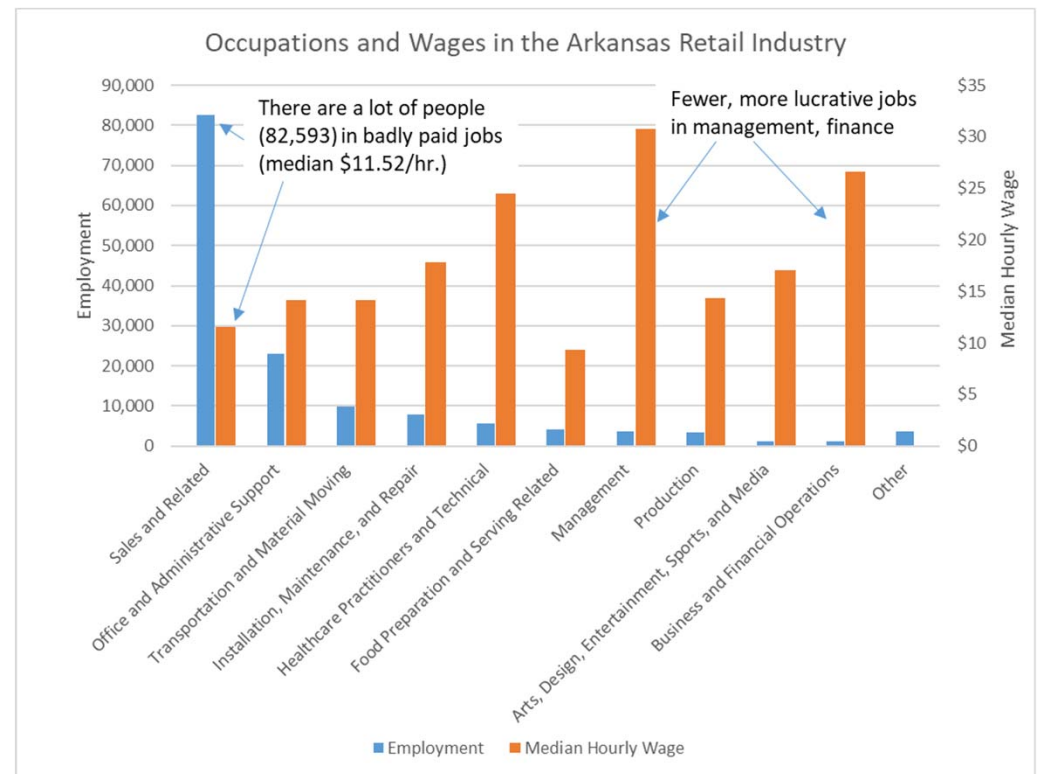


## An Uncomfortable Dilemma: People Can't Support a Family on the Wages Paid by Low-Wage Occupations, but Entry into Better-Paid Professions is Difficult and Risky



# Jobs to Get Away From: Low-Wage Employment in the Retail Industry

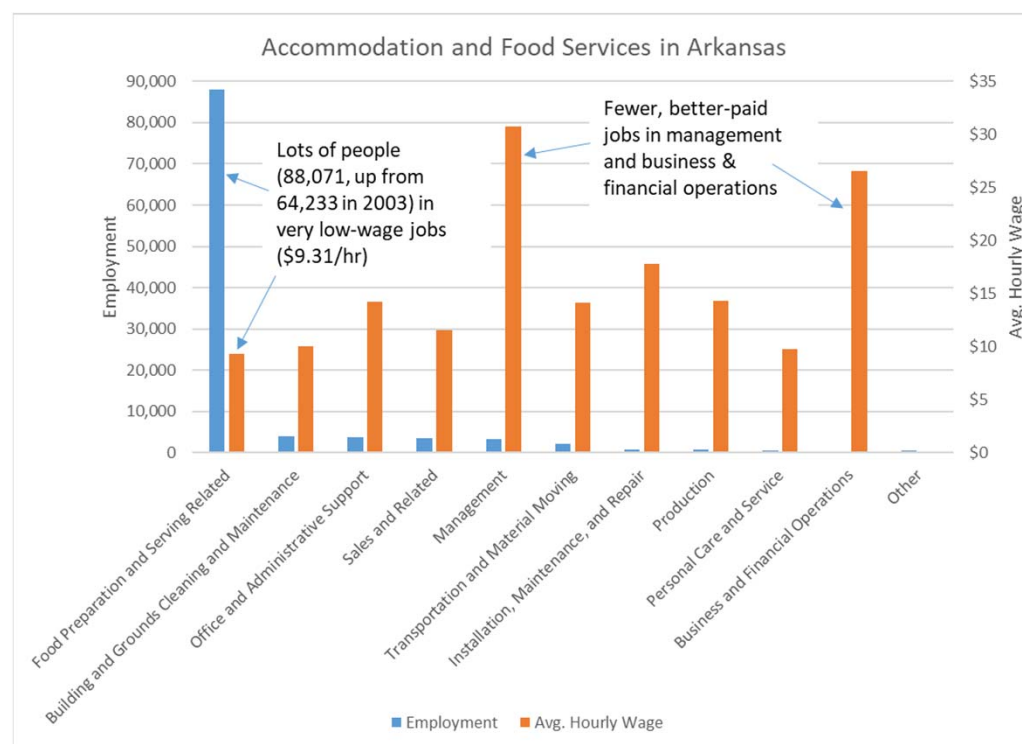
- Some industries have lots of ill-paid, low-skill jobs, and a few skilled, lucrative ones
- College hopefully enables people to leave these jobs behind
- With enough upskilling of the workforce, maybe these jobs would need to be automated!
  - Why don't supermarkets charge extra to have a person check you out instead of using the self-checkout?



Source: EMSI. Geography: Arkansas

# Jobs to Get Away From: Low-Wage Employment in Accommodation and Food Services

- Accommodation and food services is a huge employer
  - High turnover
  - Frequently a first job
  - “Hamburger flippers” and high-end chefs
- 37% increase in food prep jobs (occupation) in accommodation & food services (industry) from 2003-2018
- Most jobs last one year or less
- A “labor market gateway?”

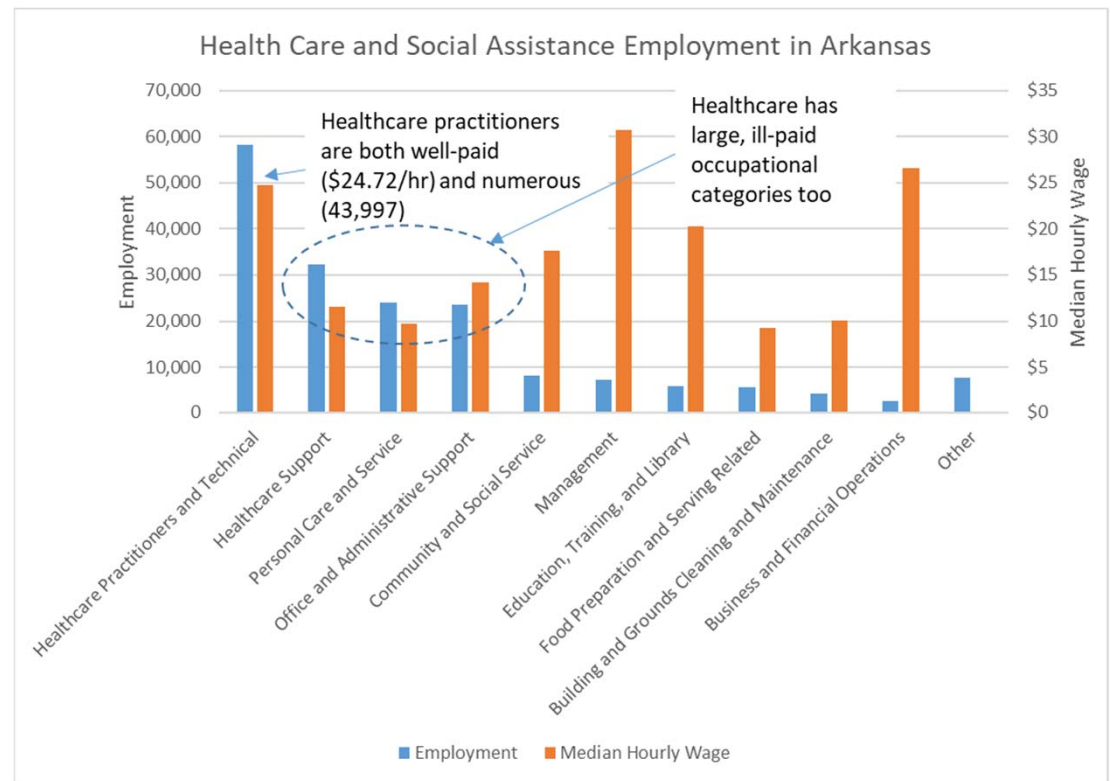


Source: EMSI. Geography: Arkansas



# Mass Skilled Employment in the Health Care Sector

- Lots of good jobs:
  - In health care, almost half (48%) of employment is in occupations where the median hourly wage is over \$15/hour
- Arguably, regulations and subsidies help insulate health care from labor-saving “creative destruction”
- For consumers, costs have risen steeply



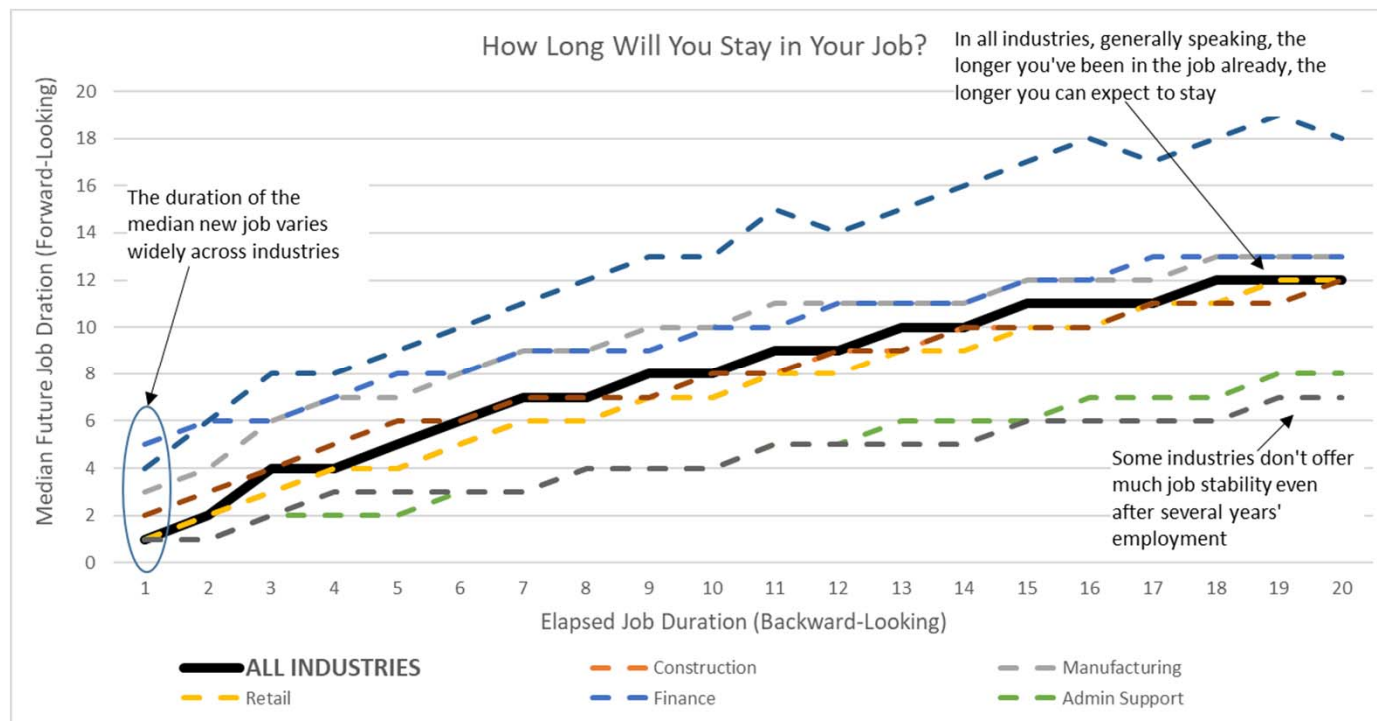
Source: EMSI. Geography: Arkansas

# The Importance of Job Stability

- A surprisingly large share of workers ( $>1/3$ ) are in-and-outs who don't hold steady jobs
- Healthy earning behavior is usually associated with long-term (e.g.,  $>3$  years) service with a single employer
  - Short-term jobs usually pay poorly
  - Steady workers accumulate more wages and get pay raises
- College may benefit people by enabling them to “hold a job”
  - Often, unskilled workers meet transient needs and/or are easily replaceable
  - Workers that become part of a company's “organizational capital” are more likely to see middle-class pay and wage growth

# The Importance of Job Stability

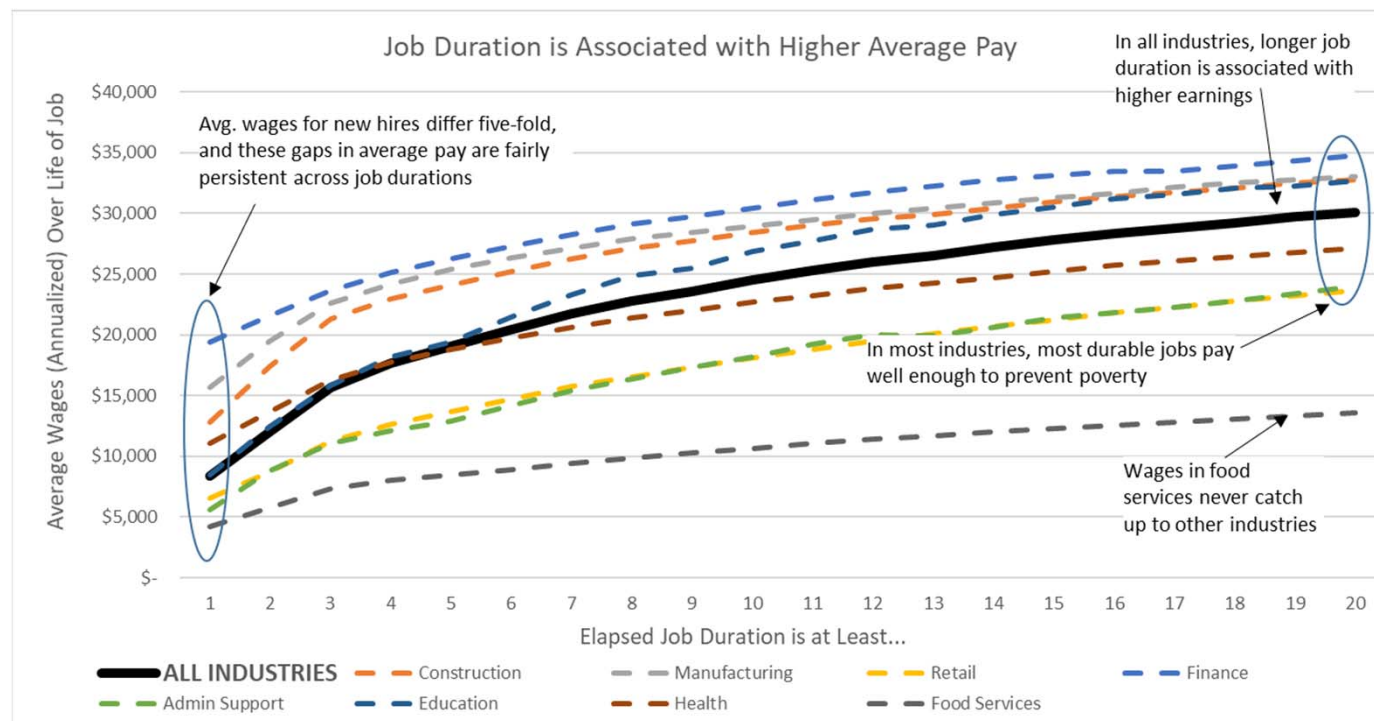
## Most New Hires Don't Last a Year



Source: UI Wage Data. Geography: Arkansas

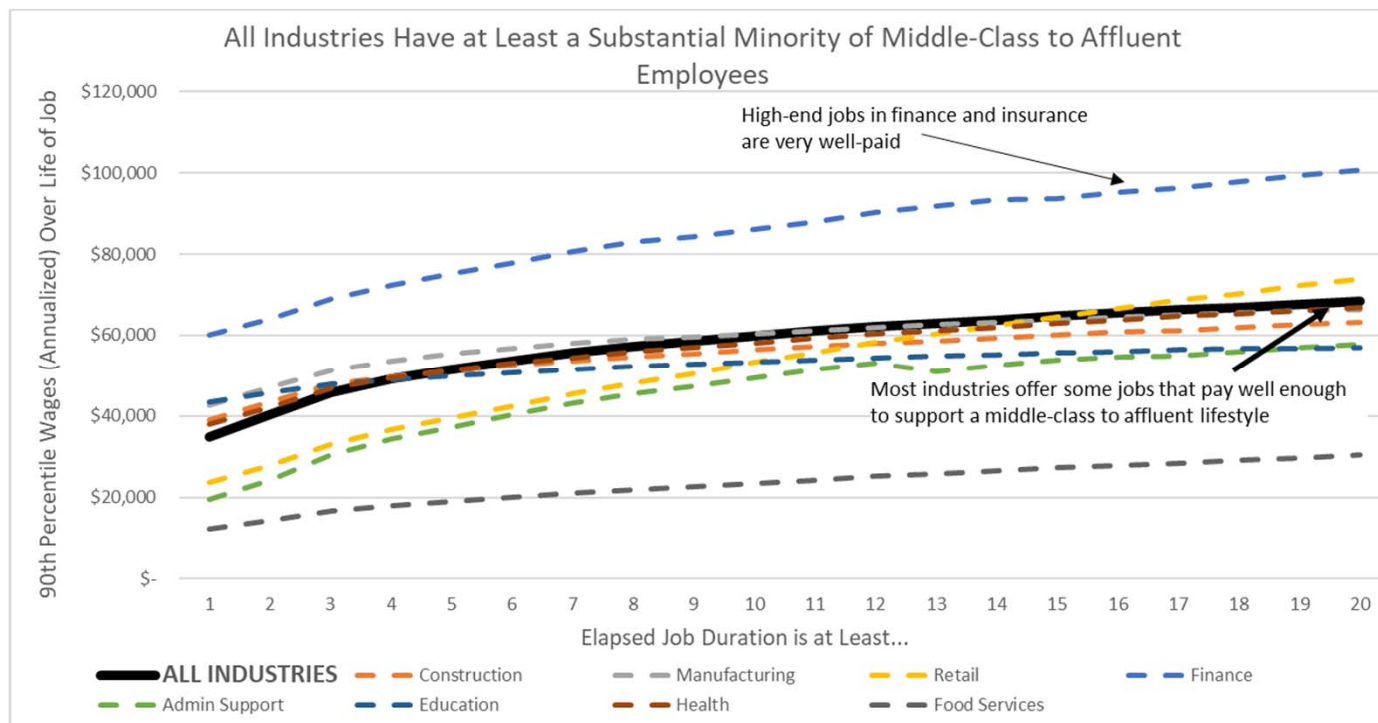
# The Importance of Job Stability

## Higher Wages Come with More Stable Jobs



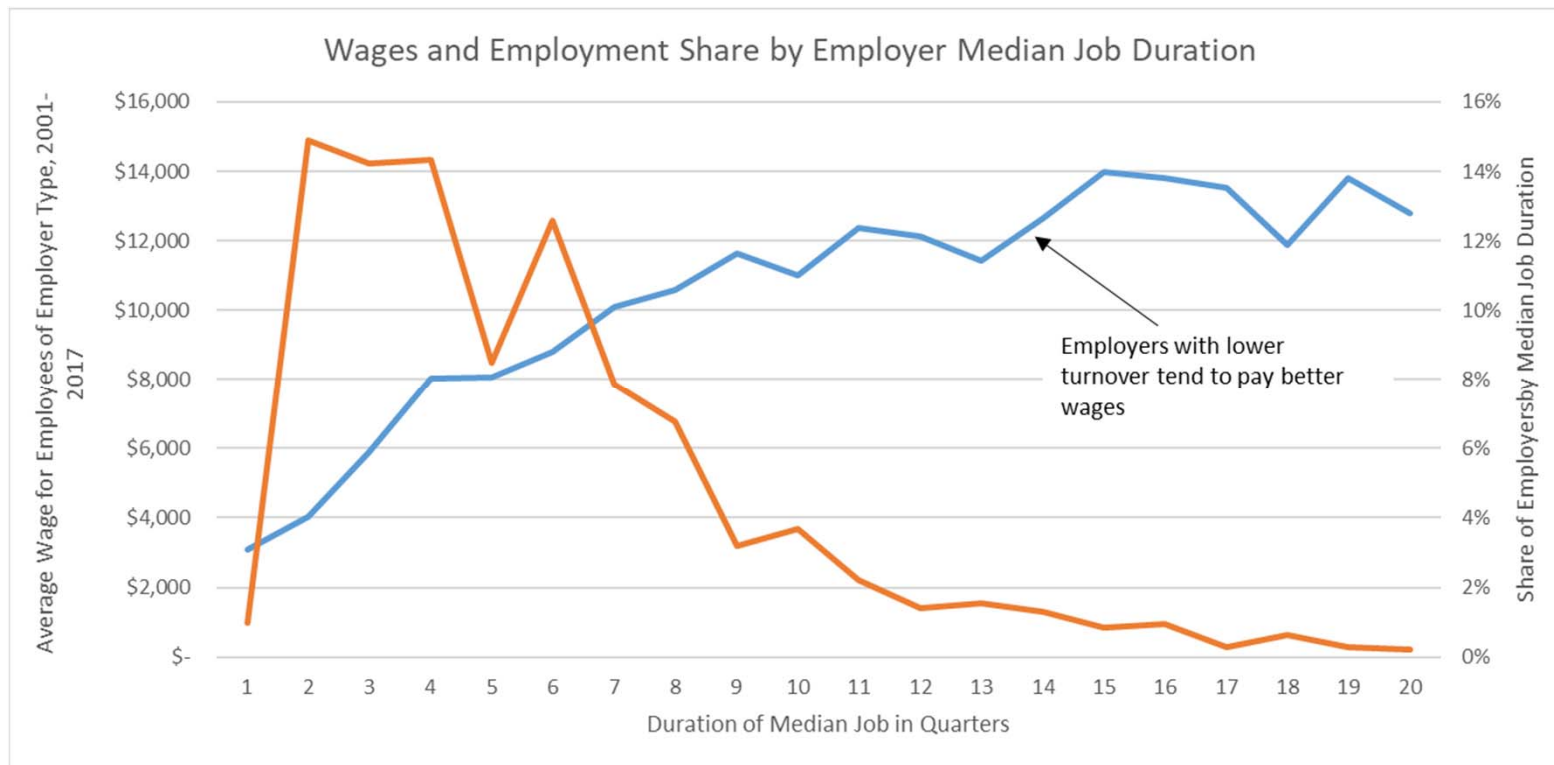
Source: UI Wage Data. Geography: Arkansas

# Most Industries Pay Middle-Class to Affluent Wages at the High End



Source: UI Wage Data. Geography: Arkansas

# Wages and Turnover Patterns: Employers with Lower Turnover Tend to Pay Better

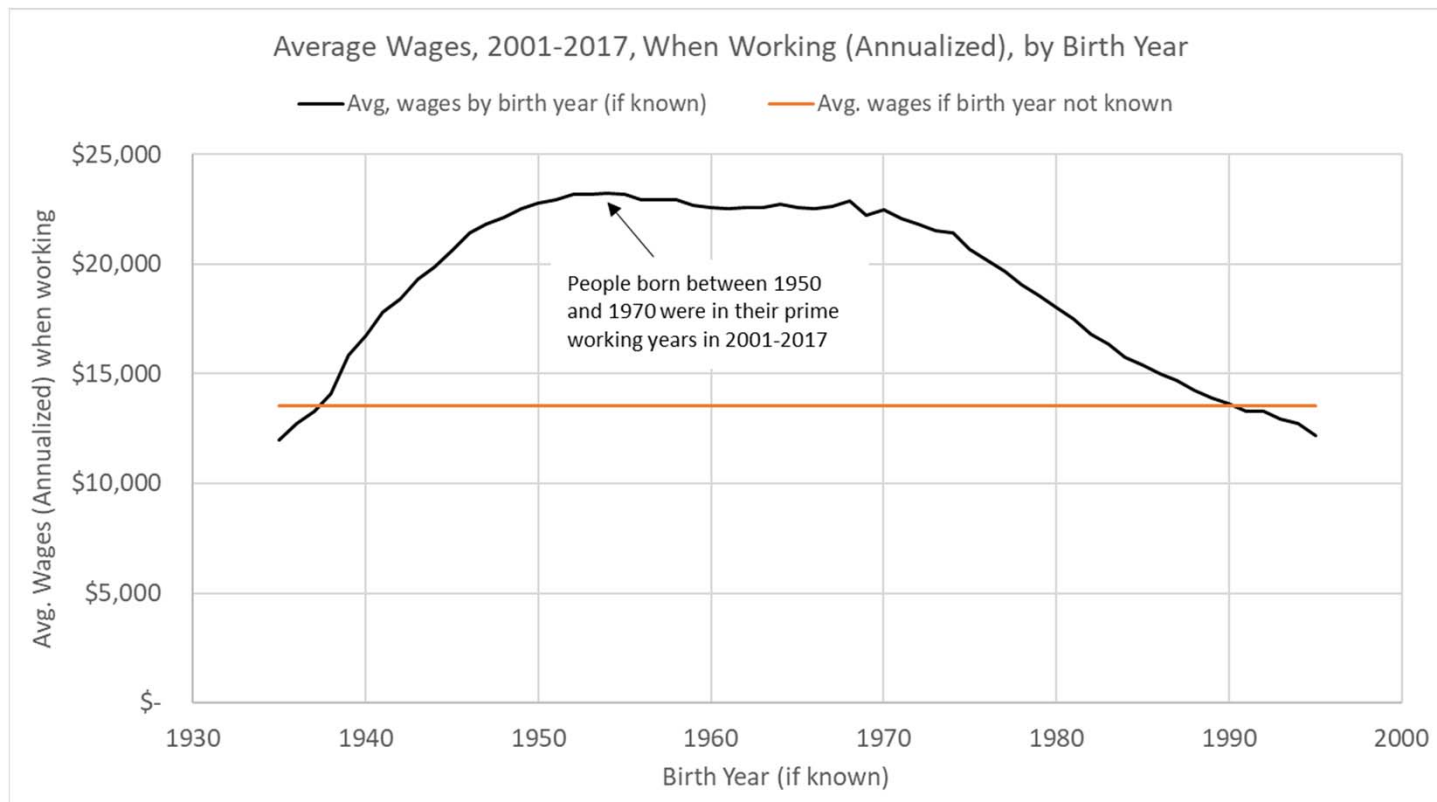


Source: UI Wage Data. Geography: Arkansas

# The Earnings Life-Cycle

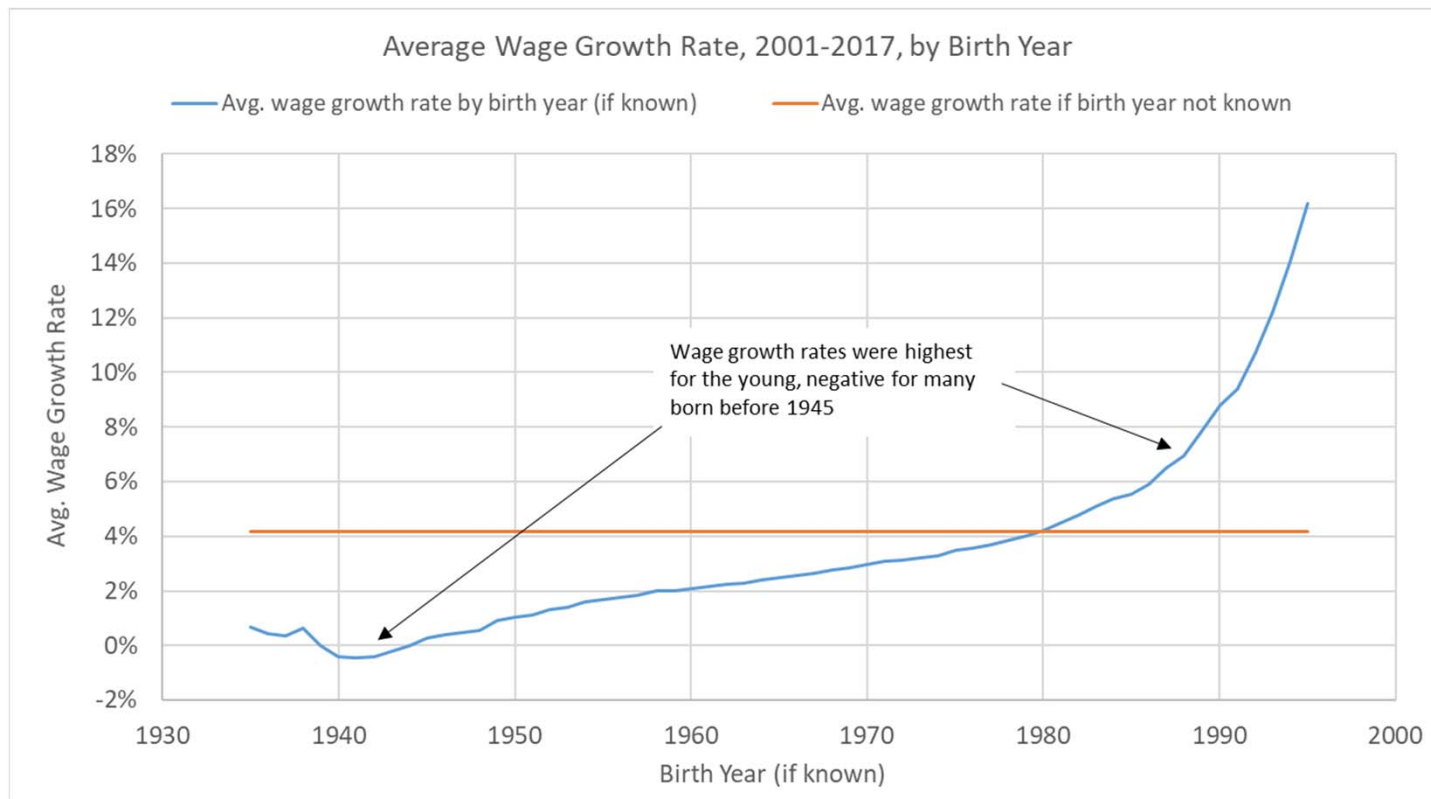
- People tend to build earning power in their 20s, and earn the most in their 30s, 40s, and 50s
- Earnings tend to get more unequal at later ages
  - Unskilled manual laborers may become less competitive as they age
  - In knowledge- and/or social capital-intensive jobs, productivity need not decline as the physical organism deteriorates
- Does college help lengthen the earnings life-cycle?
  - Good research question

# In 2001-2017, Arkansans born between 1950 and 1970 earned the most

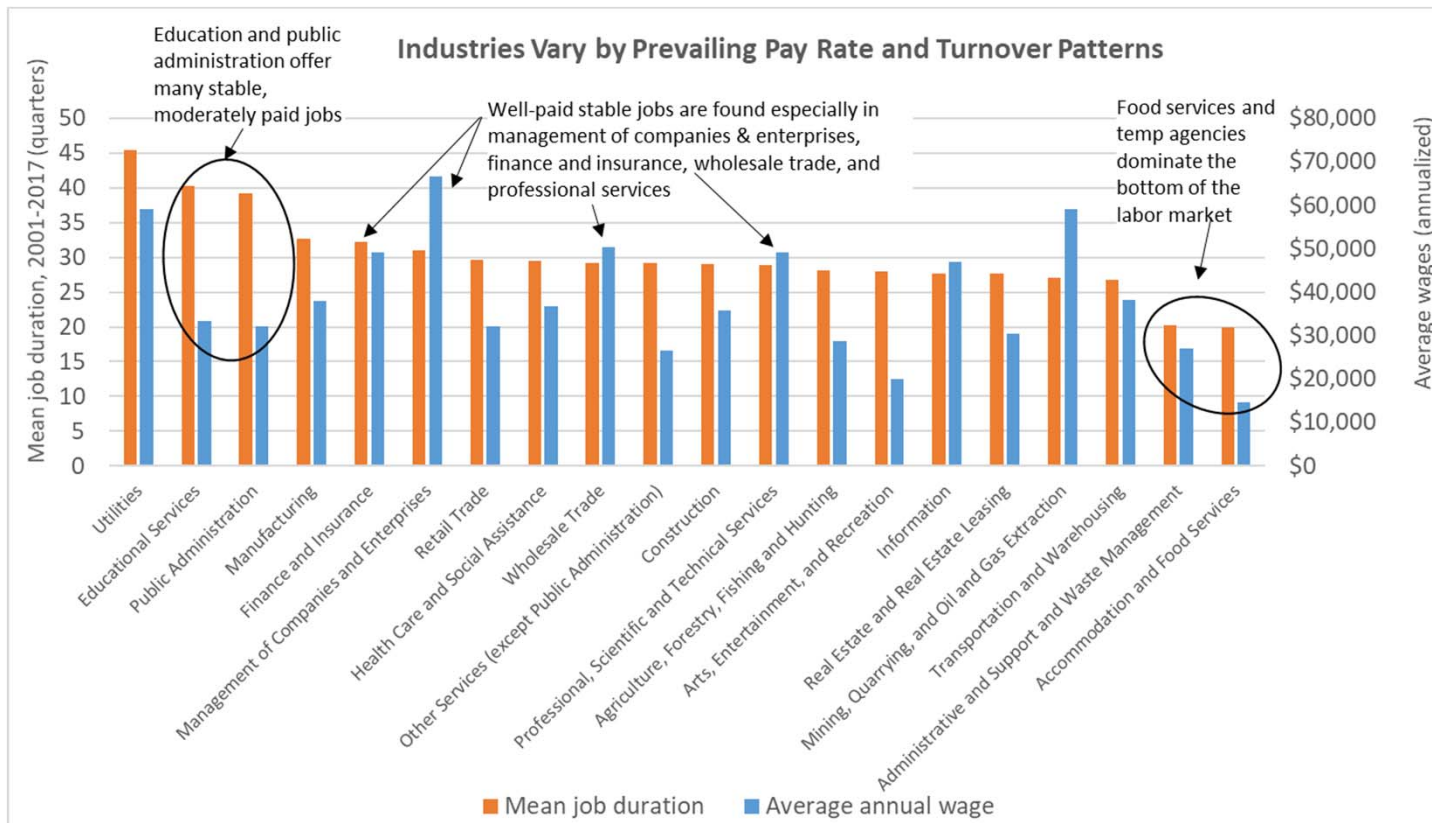




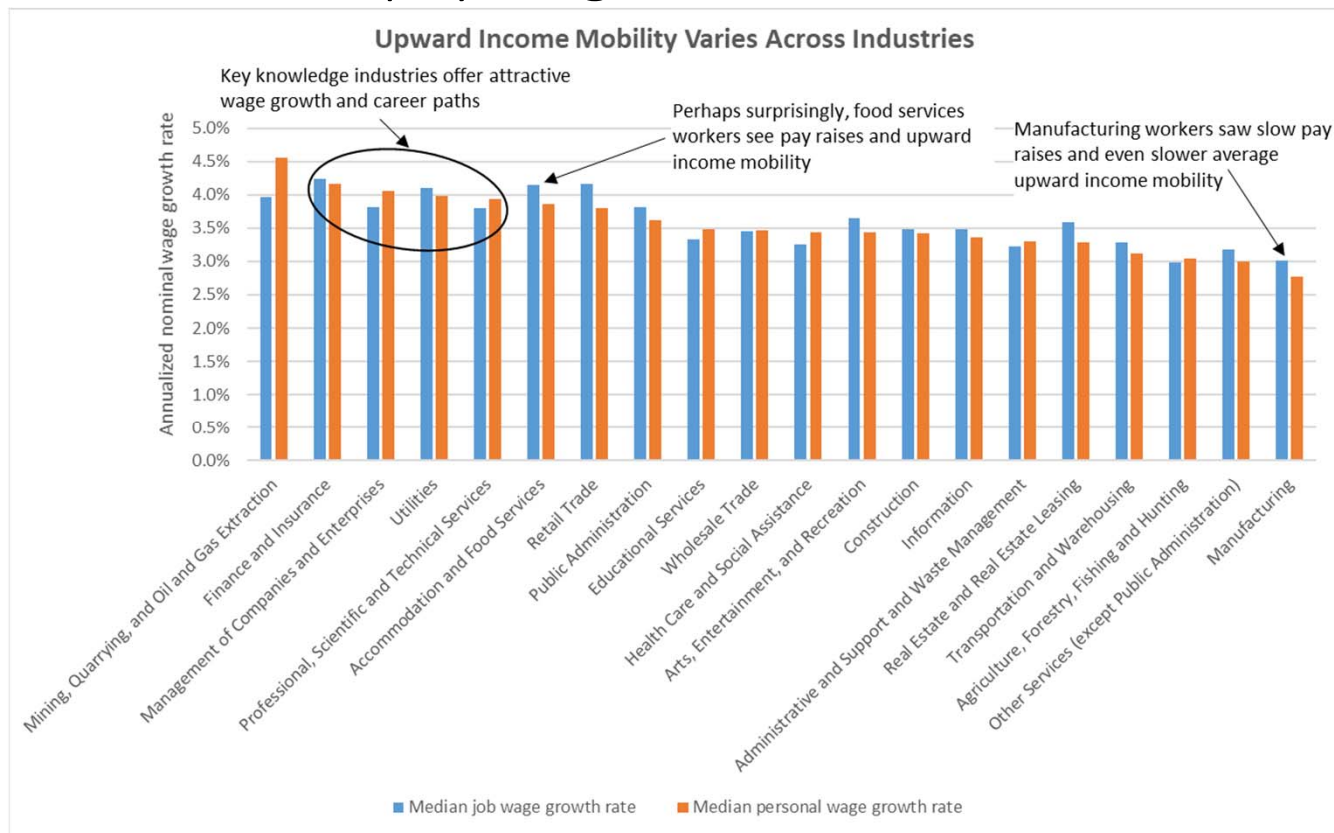
Wage growth rates were fastest for young Arkansans, negative for Arkansans born before 1945



# Some Industries Offer Many Well-Paid, Stable Jobs In Others, Low Wages and High Turnover Prevail

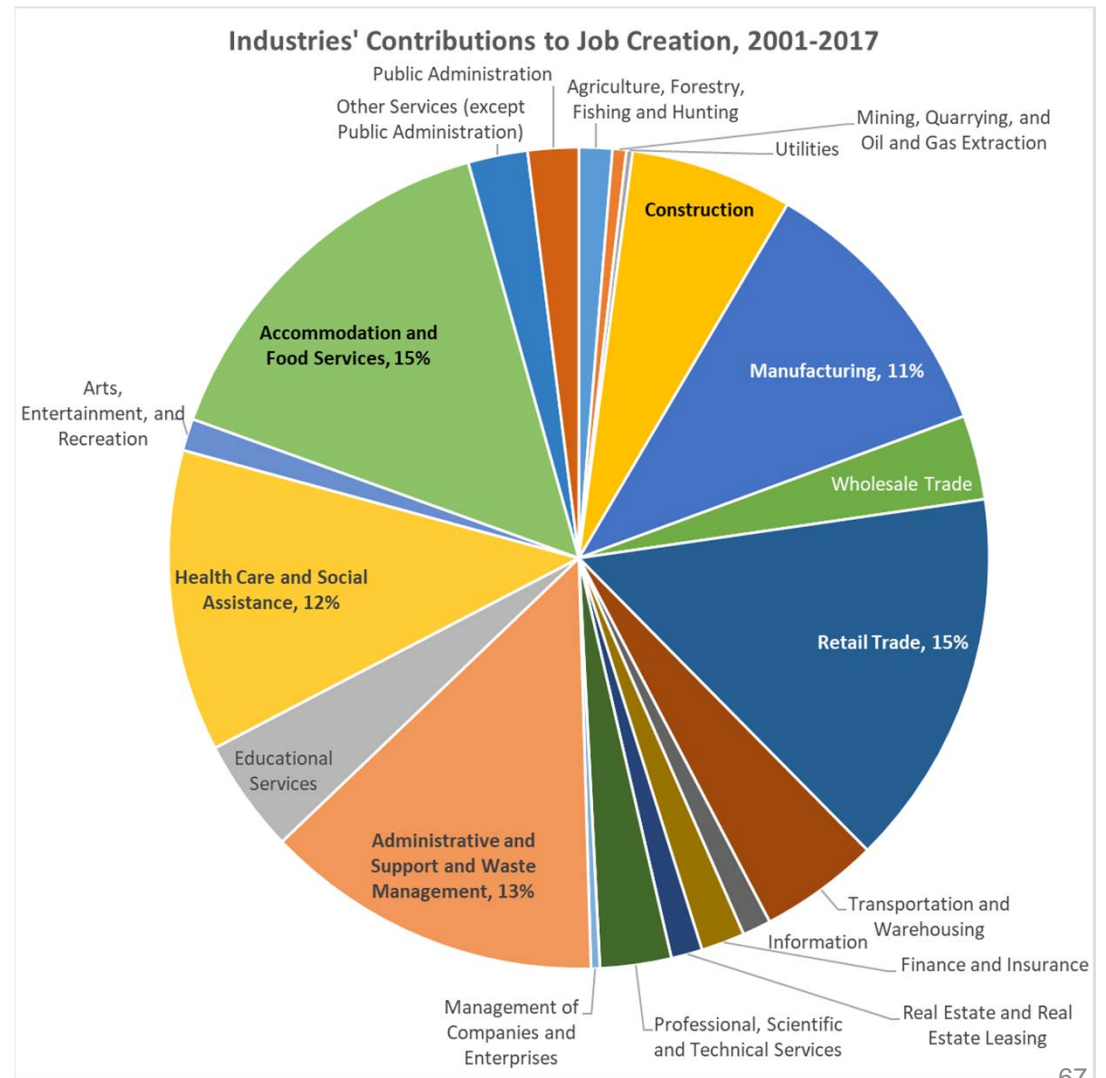


In 2001-2017, professional- and knowledge-intensive industries offered the most pay and career growth, while manufacturing workers saw pay stagnate



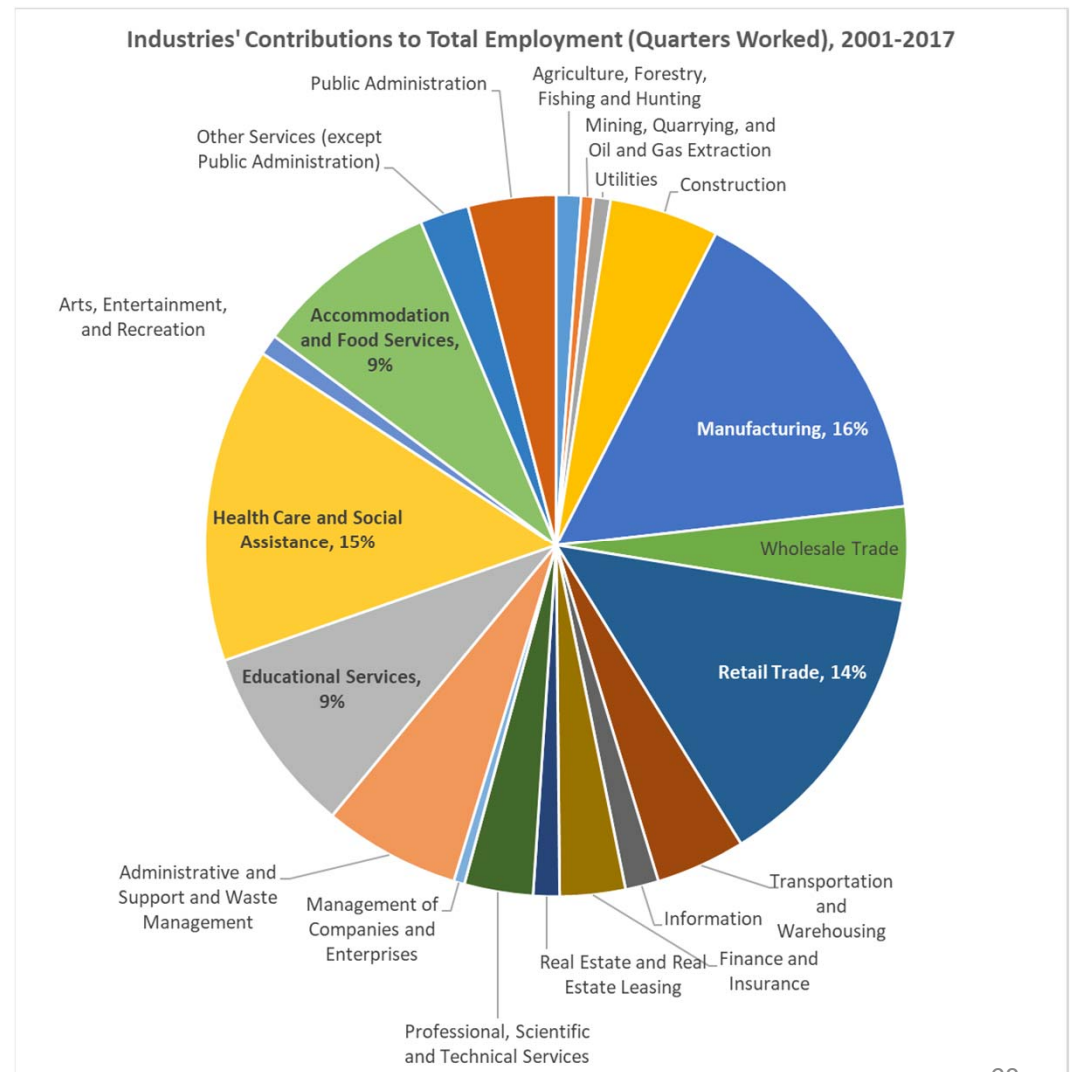
Industries with high turnover and low wages made a disproportionate contribution to job creation in 2001-2017

- Accommodation and food services
- Administrative and support and waste management (includes temp agencies)



The largest contributors to total employment (quarters worked) were:

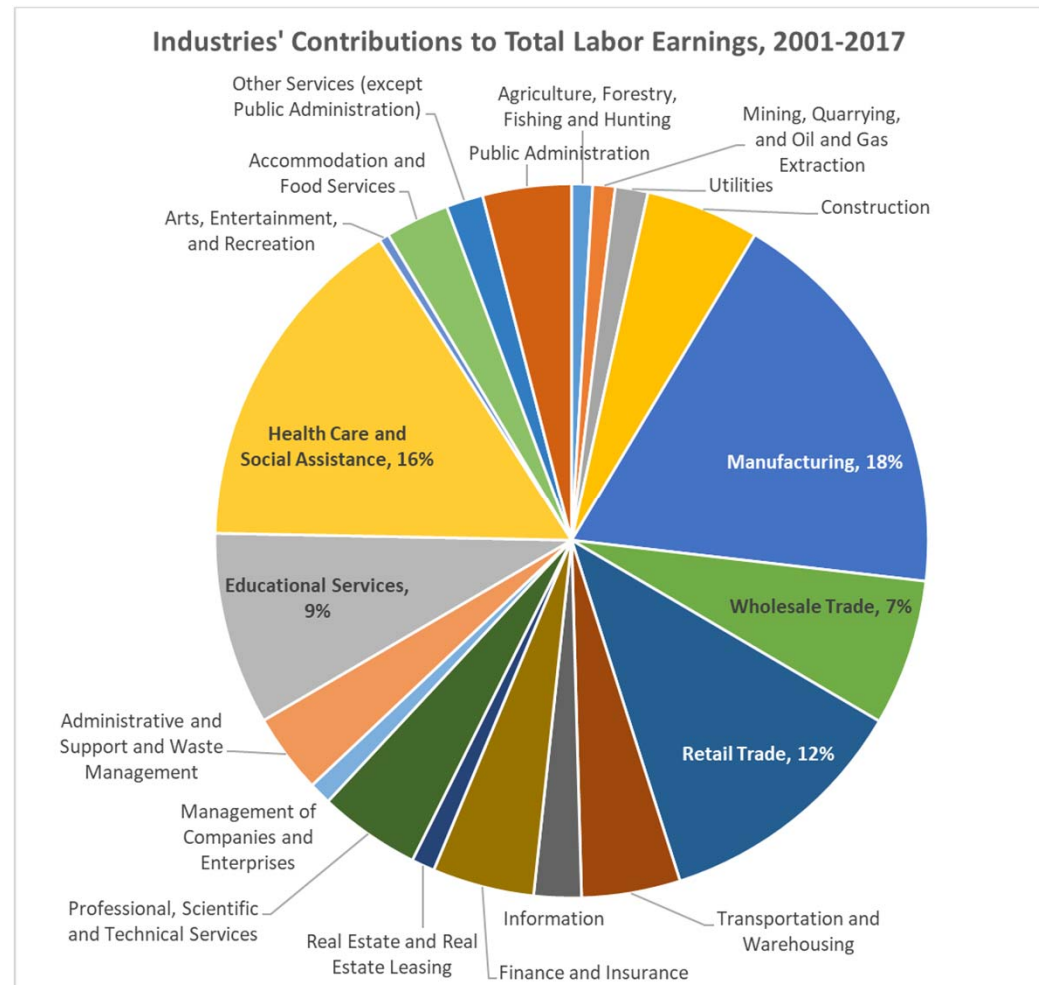
- Manufacturing (16%)
- Health care and social assistance (15%)
- Retail (14%)
- Education, accommodation and food services, and admin support



## Largest contributors to total earnings:

- Manufacturing (18%)
- Health care and social assistance (16%)
- Retail (12%)
- Education (9%)

Accommodation and food services was fairly unimportant (<3%)

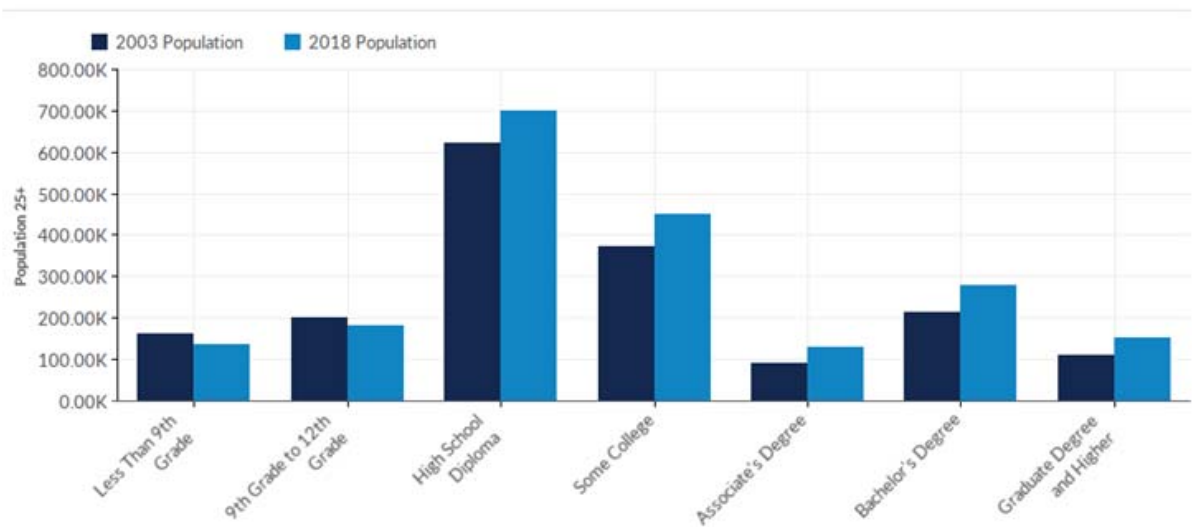


# RETURNS TO EDUCATION

# College Educated Population is Up, but Retention is a Problem

- Bachelor share rose from 12.1% (2003) to 13.8% (2018)
- Retention is a problem
  - “Some college” share increased
  - Most who start college don’t complete a Bachelor’s degree
- Half the population has no college

Educational Attainment by Level

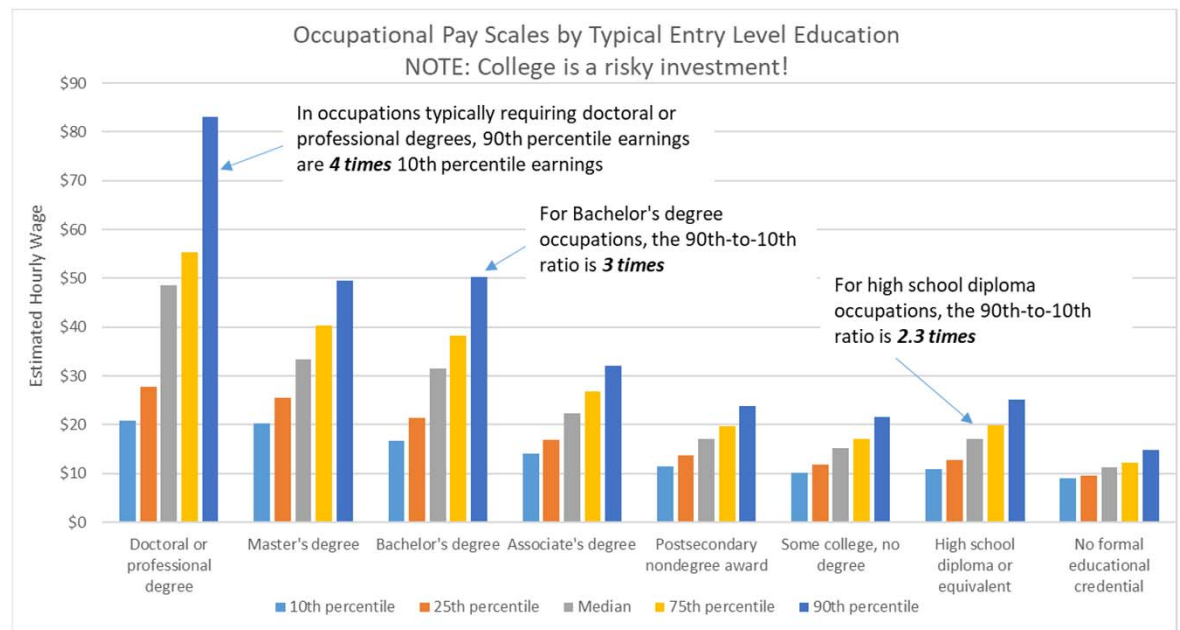


Source: EMSI. Geography: Arkansas



# Occupations with Higher “Typical Levels of Education” Pay More

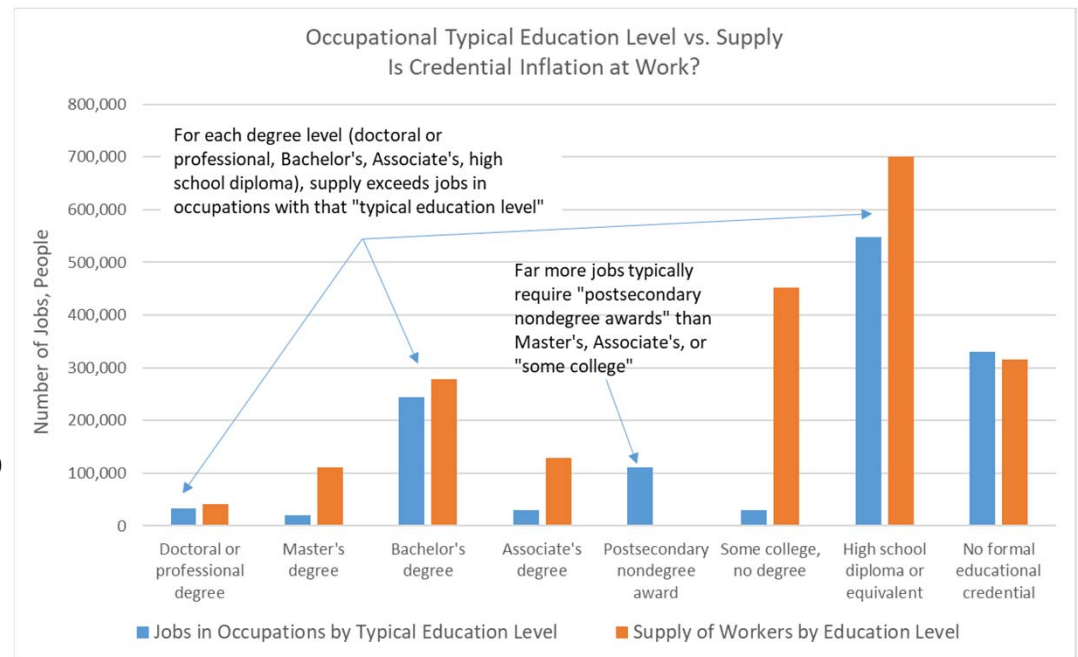
- College is a risky investment
  - More education => higher median wages
  - More education => more wage dispersion
  - Overlapping pay scales
    - 90<sup>th</sup> percentile high school diploma occupations make more than 10<sup>th</sup> percentile doctoral or professional degree occupations
- Sheepskin effects
  - Median earnings jump at Bachelor's, doctoral/professional
  - Smaller wage gains for Associate's, Masters'
  - Returns to some college (no degree) look **negative**
    - But... correlation vs. causation



Source: EMSI. Geography: Arkansas

# At Every Level of Academic Educational Attainment, There are More Candidates than Jobs

- Naïve interpretation: most degree levels are in (at least slight) “oversupply”
- Why that’s naïve:
  - Can’t hire without candidates
    - Maybe employers would create more jobs for Bachelors, PhDs, if they were available
    - Markets need reserves for liquidity
  - More education can be useful in a job without being “typical” or required
- But there’s no guarantee that graduates will find suitable work

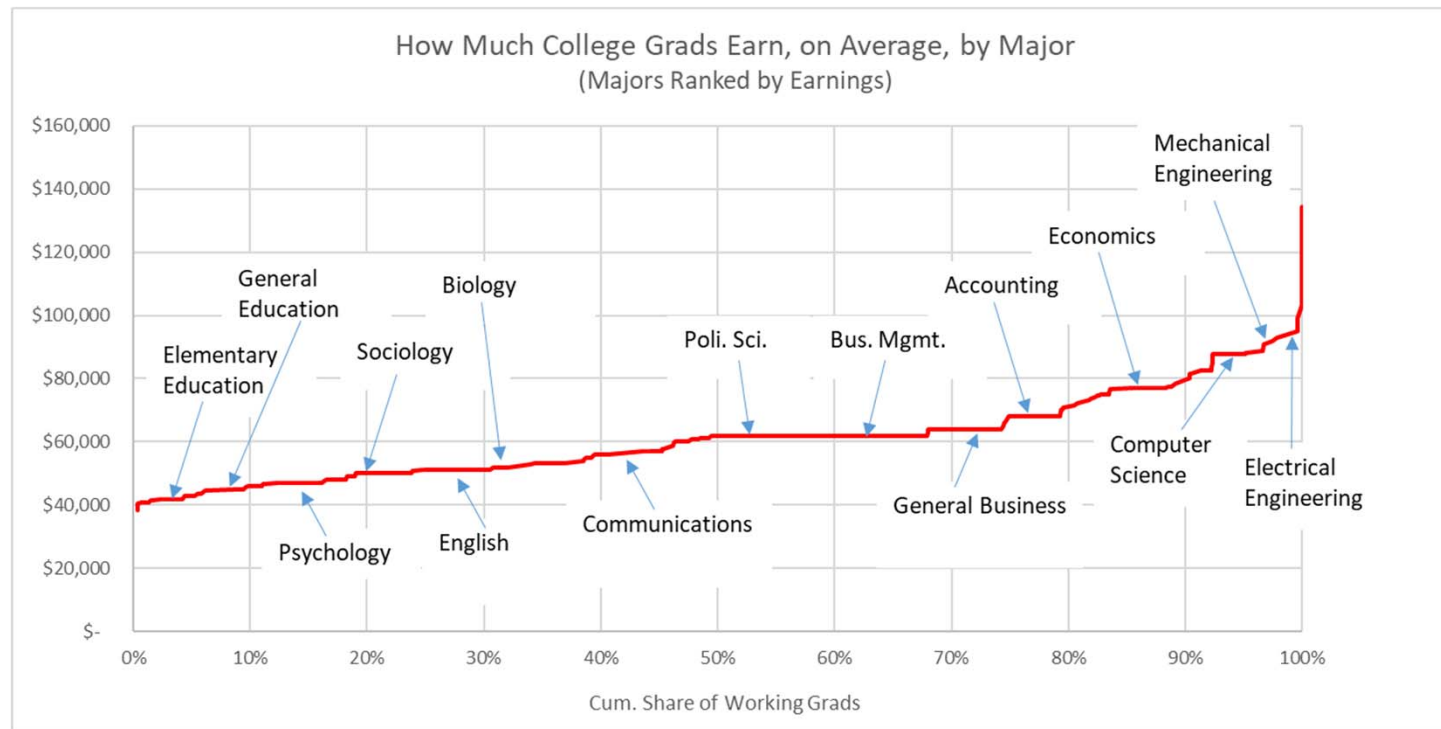


Source: EMSI. Geography: Arkansas

# Do People Work in Their Fields?

- If the human capital explanation of the college earnings premium is true, we should expect:
  - Most people to “work in their field”
  - The college earnings premium to be most pronounced for people who “work in their field”
  - In principle, this should be empirically testable
- Data sources:
  - American Community Survey microdata
    - Contains major (for Bachelor’s degree or higher), occupation, earnings and age
    - [details, e.g., N, time period...]
  - For whether individuals are “working in their field,” a CIP-SOC (Classification of Instructional Programs-Standard Occupational Code) crosswalk published by the National Center for Educational Statistics

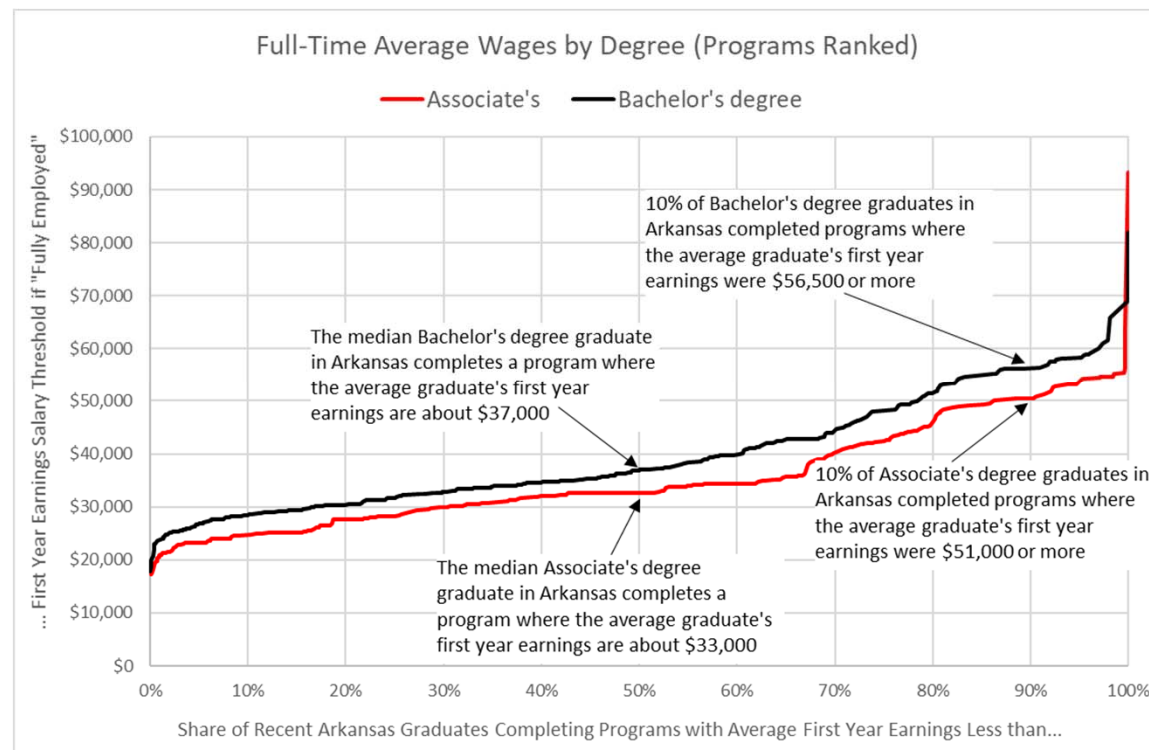
# Some Majors Pay Better than Others



Source: Census Bureau ACS. Geography: National

# How Much Education is Worth Getting?

## ARC Data on First Year Earnings



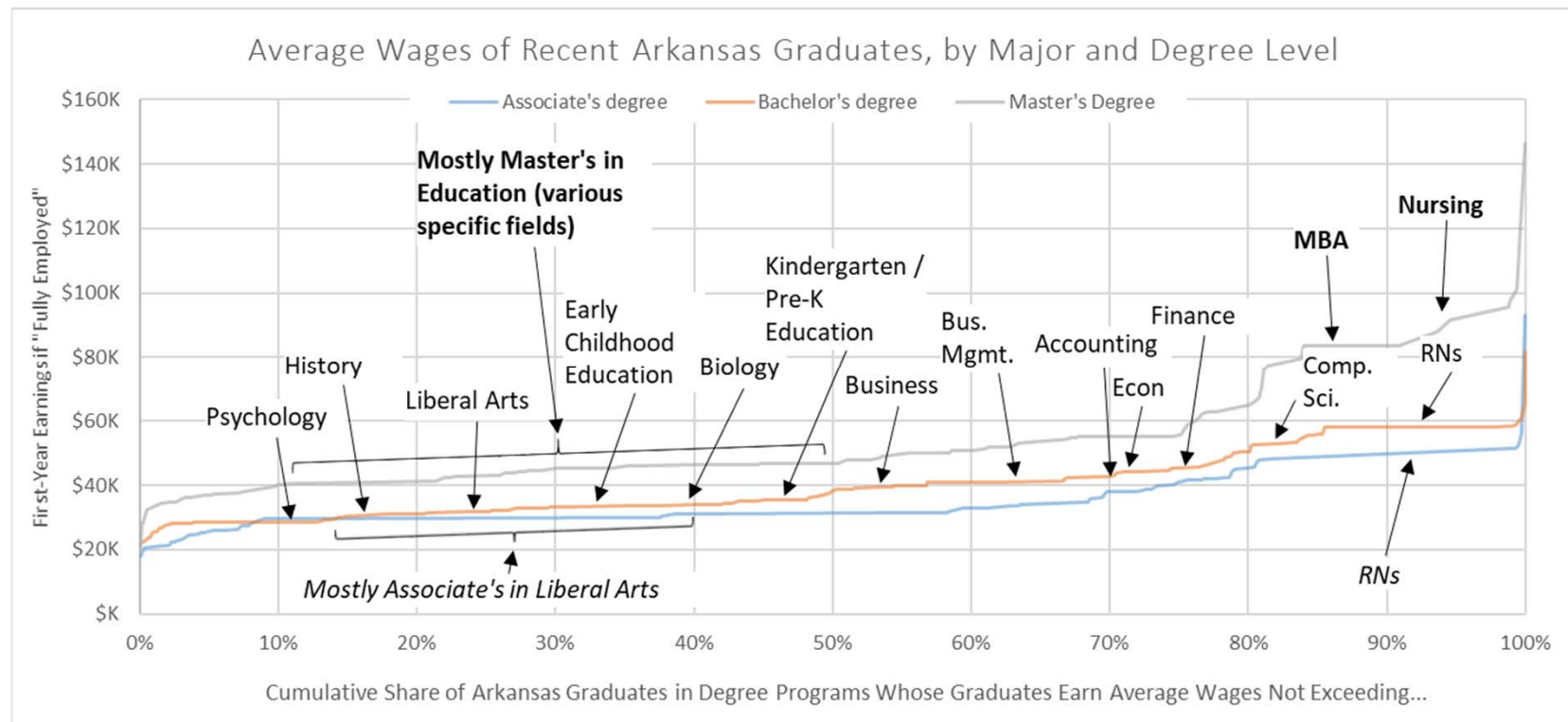
Source: ARC's Economic Security Report. Geography: Arkansas

# How Much Education is Worth Getting?

## Back-of-the-Envelope Calculations

- ARC data (hastily and naively read) suggest that a Bachelor's degree confers a roughly 10% earnings premium in Arkansas
- Two years of typical Associate's degree earnings at \$30K-\$50K = \$60K-\$100K
  - I'm ignoring costs for tuition, books, room-and-board (if extra costs are incurred due to study)
- Historic stock market return = 7% per year
  - Indebted individuals may pay interest rates >7%
  - Implicit rates of return for homeownership can be >7% depending on circumstances
- \$60K-\$100K of foregone earnings  $\times$  7% per year = \$4,200-\$7,000 of investment income
  - This is similar to the Bachelor's degree first-year wage premium
  - Paraphrasing economist Bryan Caplan: College is a great deal for great students, an okay deal for okay students, and a poor deal for poor students
- Is college worth it? Not an open-and-shut case...

# How Well Majors Pay (First-Year Earnings) in Arkansas, by Degree Level



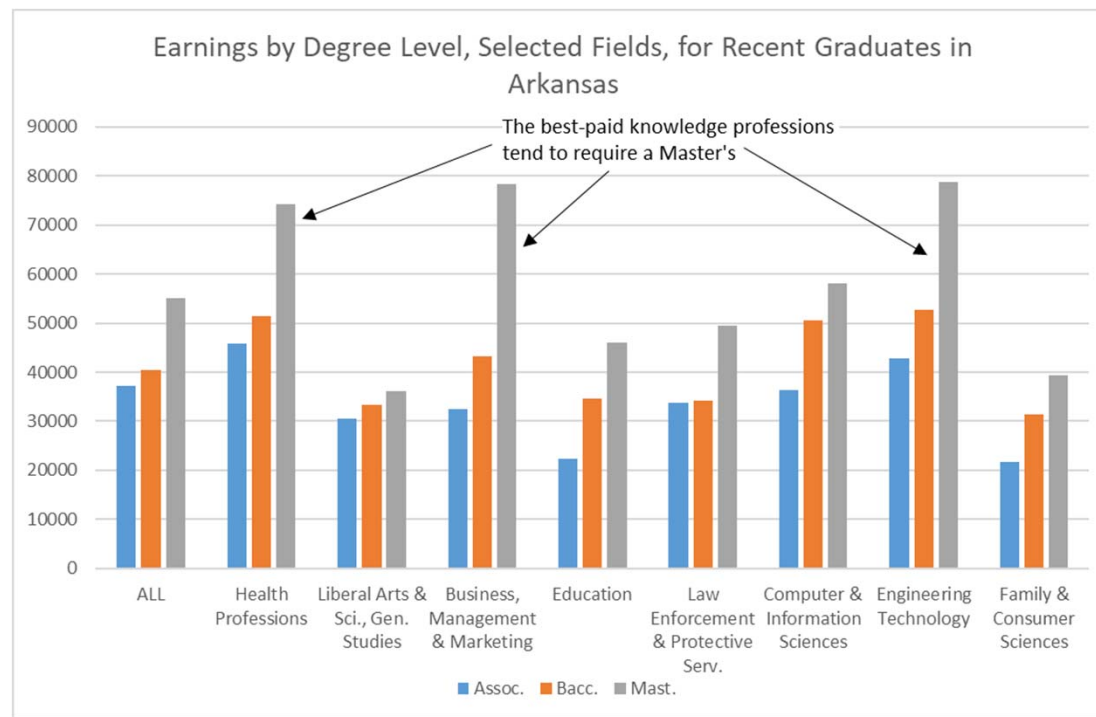
Source: ARC's Economic Security Report. Geography:  
Arkansas

# Why Do Grads in Arkansas Appear to Make So Little?

- Median earnings in Arkansas (e.g., \$37K for Bachelor's degree graduates), from ARC, look less favorable than national median earnings (e.g., >\$60K for Bachelor's degree graduates) from Census Bureau ACS
- Reasons why:
  - ARC shows "first-year earnings" immediately after graduation, whereas ACS has an age-diverse sample
    - It takes time to adjust back to the labor market after degree completion
    - Most people's earning grow over time, due to:
      - Career/Life-cycle effects
      - General economic growth
  - Grads who go on to further full-time education (sometimes the most talented?) won't have "first-year earnings" to show
  - Grads who move out of state
- ARC's "Economic Security Report" tends to understate the returns to education
  - Solution: Look at more data, e.g., 3<sup>rd</sup>-year earnings, 5<sup>th</sup>-year earnings, long-term earnings trajectories...

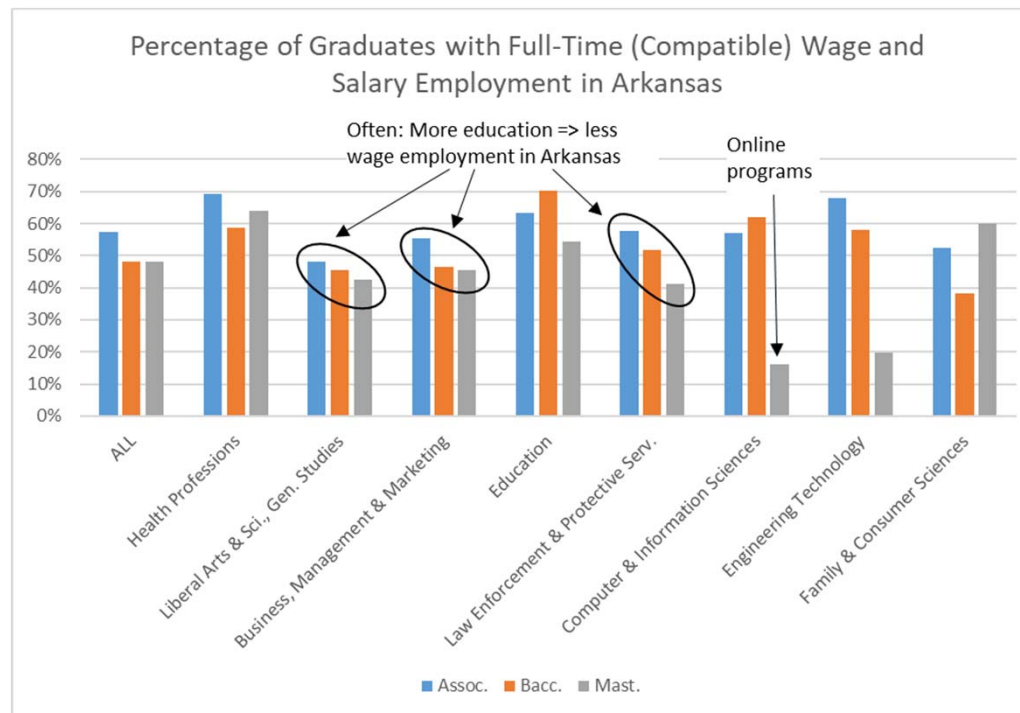


# The Impact of Degree Level on Labor Market Payoffs Varies by Field



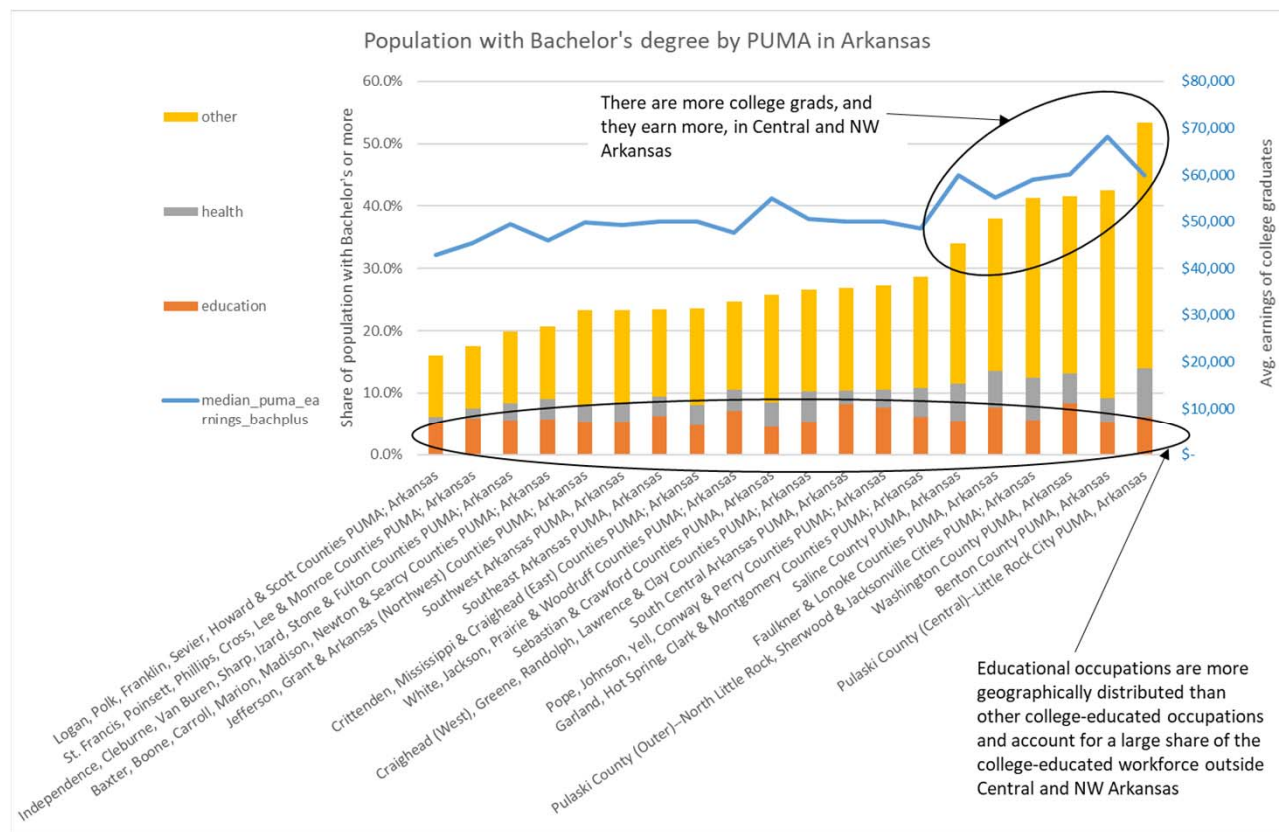
Source: ARC's Economic Security Report. Geography: Arkansas

# Often, Higher Degree Levels are Followed by Lower Rates of Wage Employment in Arkansas



Source: ARC's Economic Security Report. Geography: Arkansas

# College Graduates are Disproportionately Urban Outside Central and NW Arkansas, a Large Share are Educators

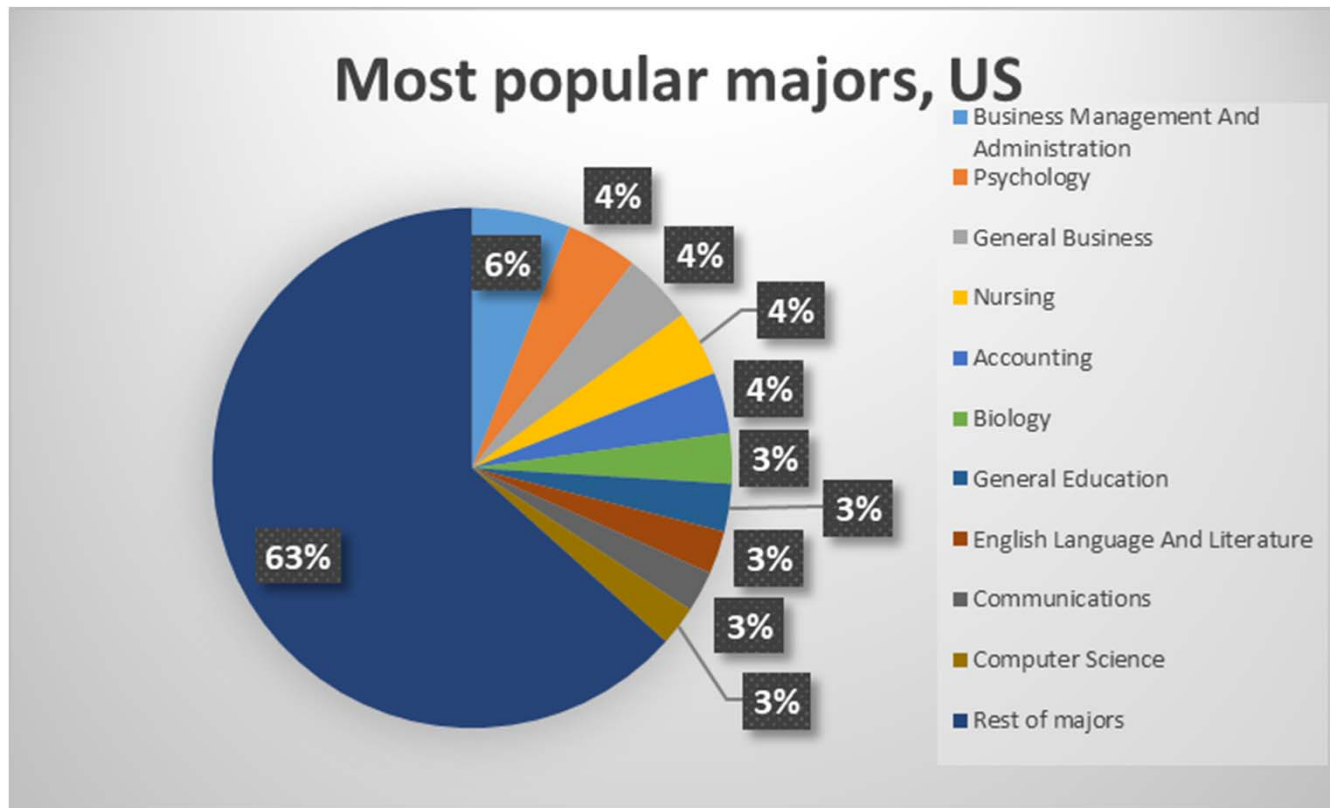


DO PEOPLE WORK IN THEIR  
FIELDS?

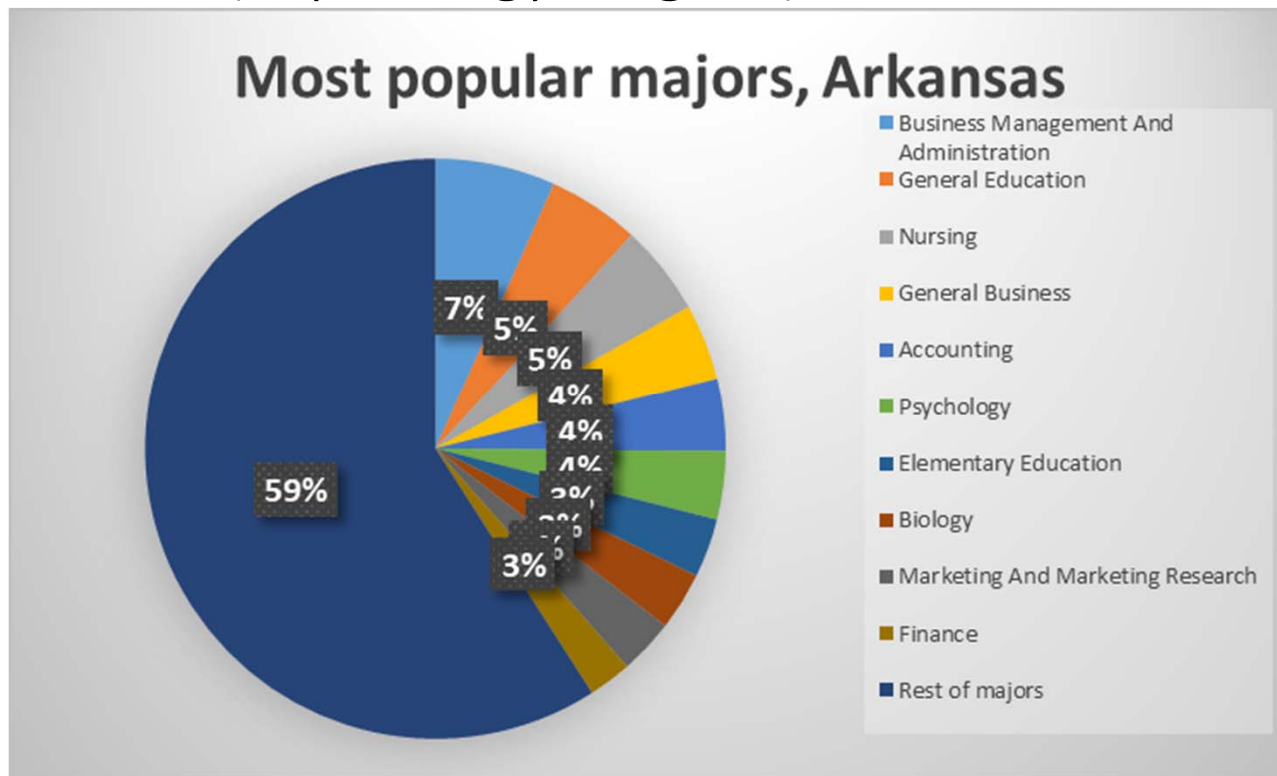
# Do People Work in Their Fields? Should They?

- Majors differ greatly in how closely matched they are to actual jobs
  - The vast majority of nursing majors work in their field
  - Almost no one who majors in humanities or liberal arts works in their field
- But “impractical” majors can pay
  - Economics majors are among the highest earners, even though few people work “in” economics *per se*
- Majors don’t always need direct job relevance to be worthwhile
  - Let us know if you think a proposed major has “indirect” value, and we’ll try to think of ways to study that empirically
- We use a “CIP-SOC crosswalk” published by the National Center for Education Statistics (NCES) to define which major/occupation dyads are “matched”
  - Data source for this section: Census Bureau American Community Survey microdata

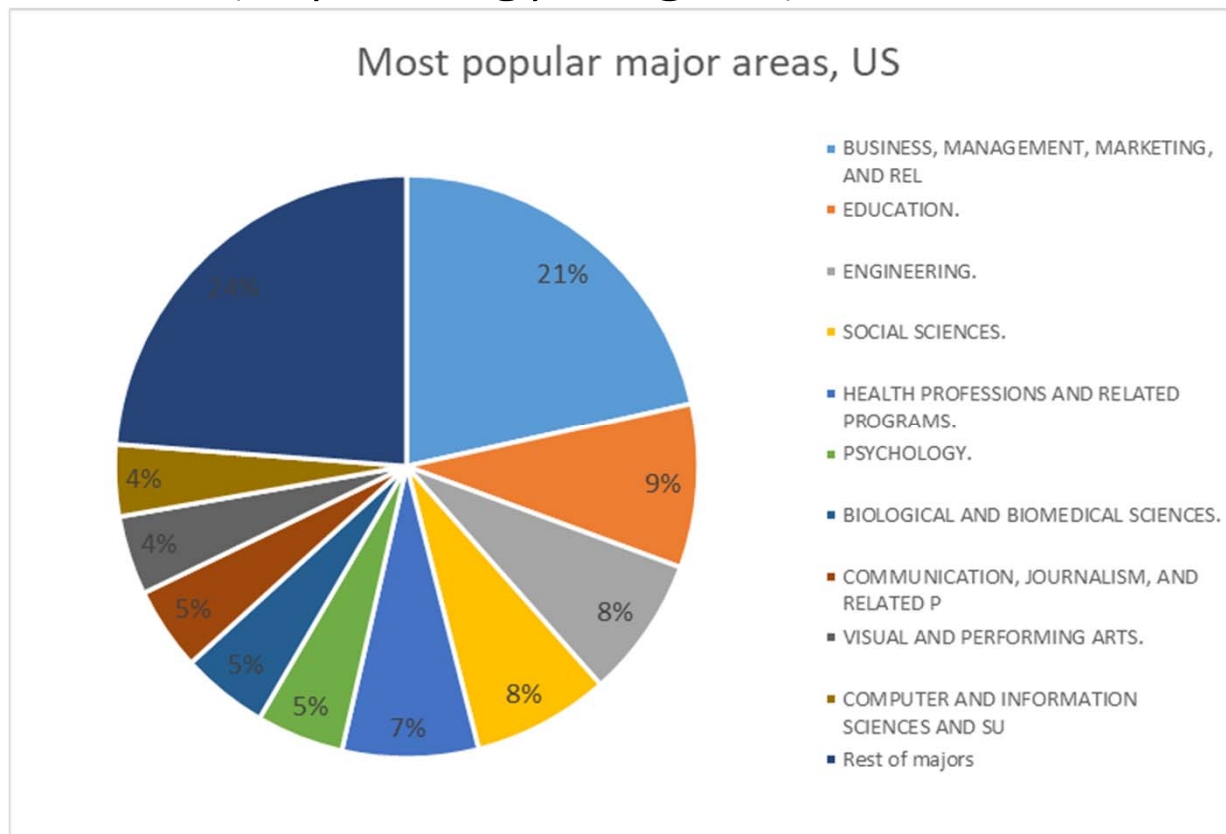
Some Popular Majors (Business, Nursing, Accounting) Have Obvious Job Relevance  
Others (Psychology, English) Don't



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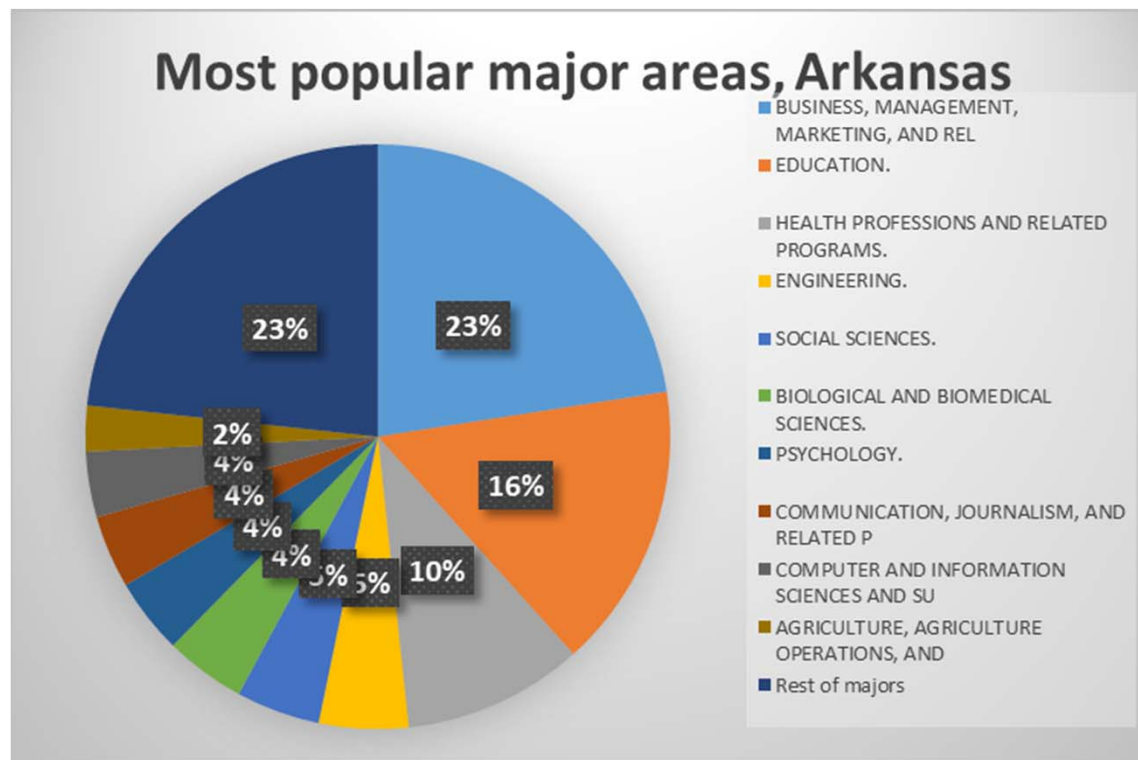


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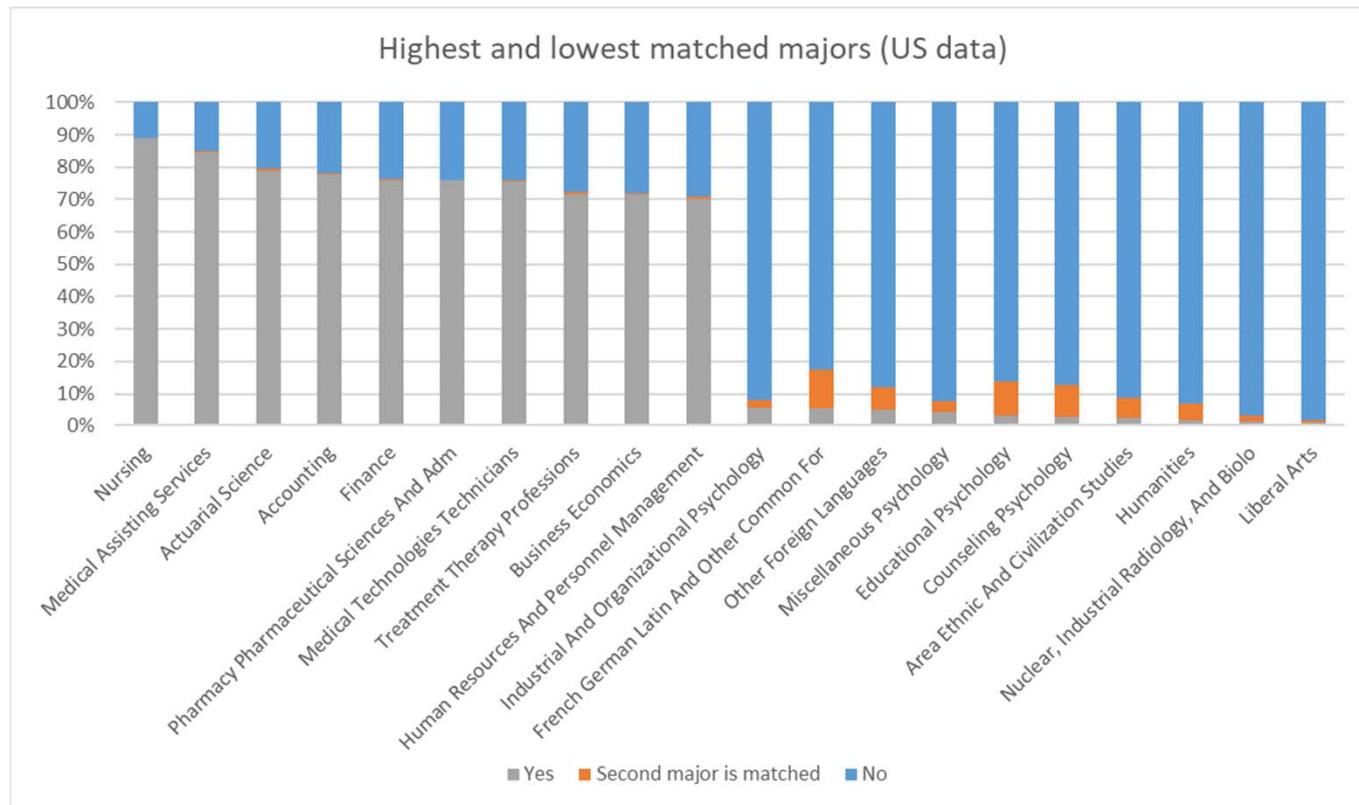




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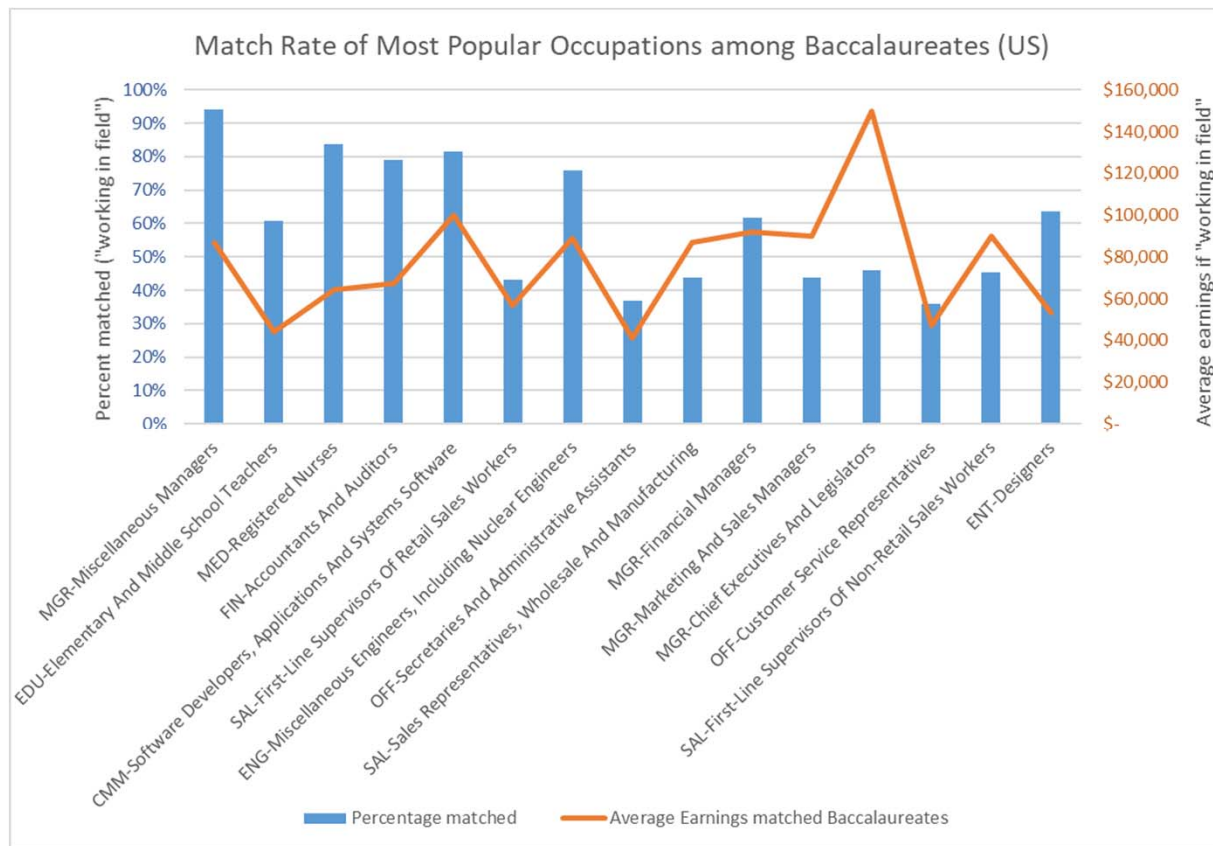


# Most and Least Job-Relevant Majors



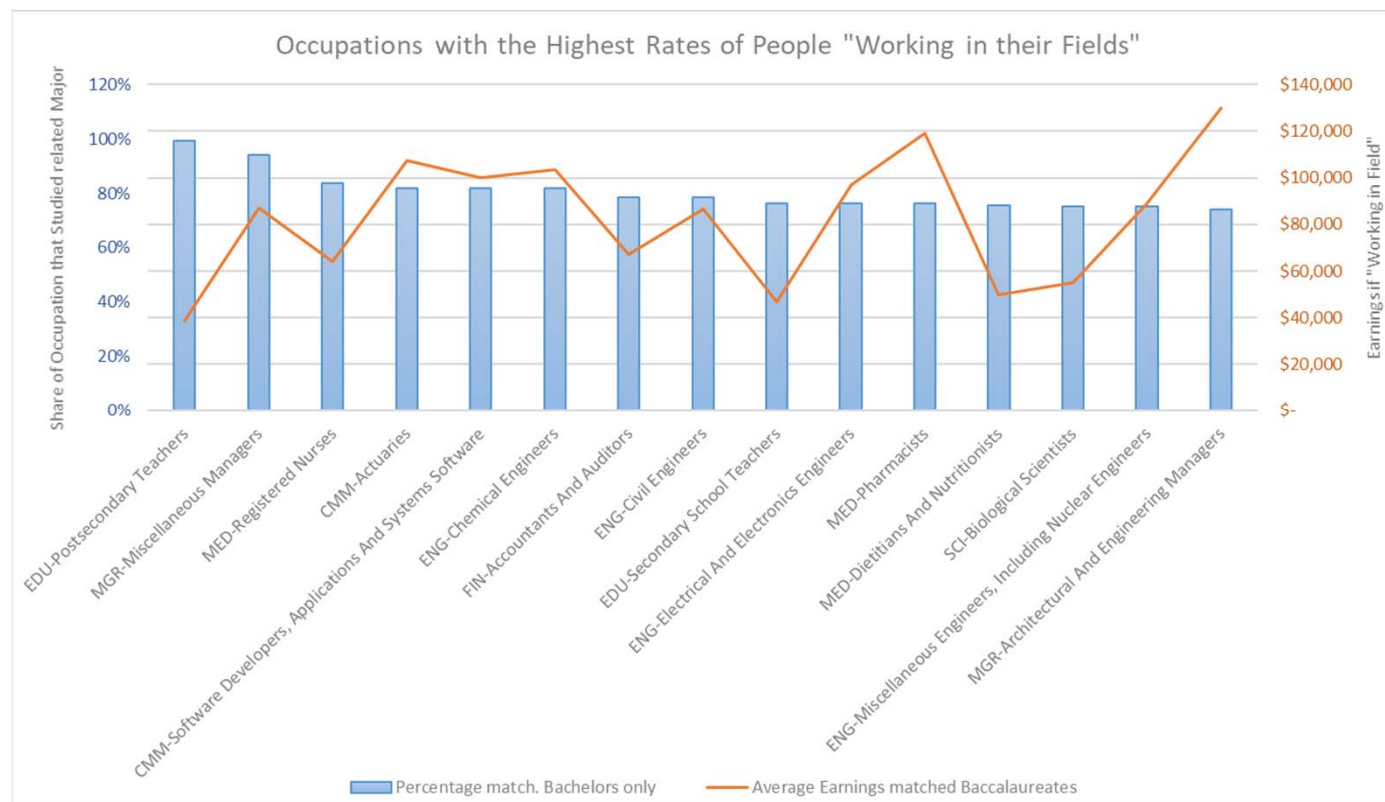
## Do People Work in Their Fields?

In Some of the Most Common Occupations, Fewer than Half of College Grads Had a Related Major



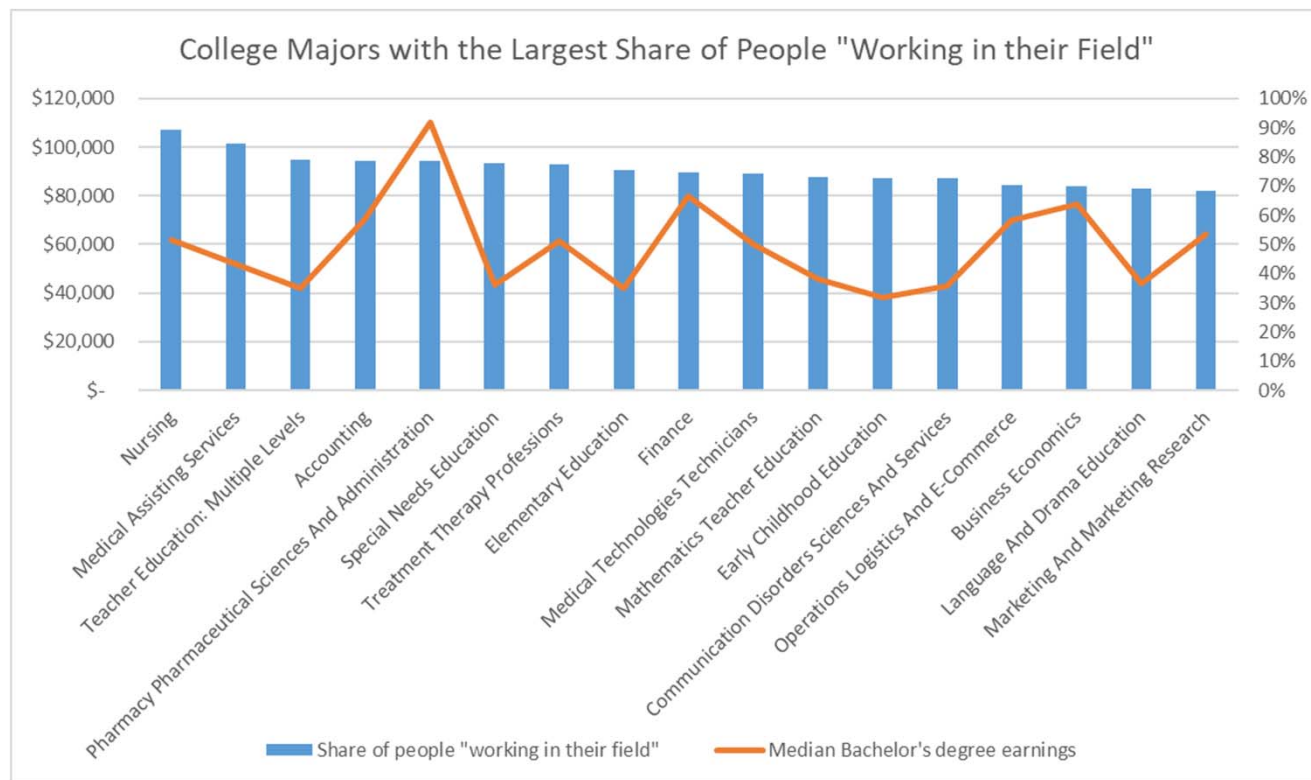
# Do People Work in Their Fields?

## Occupations with the Highest Rates of Job-Relevant Education



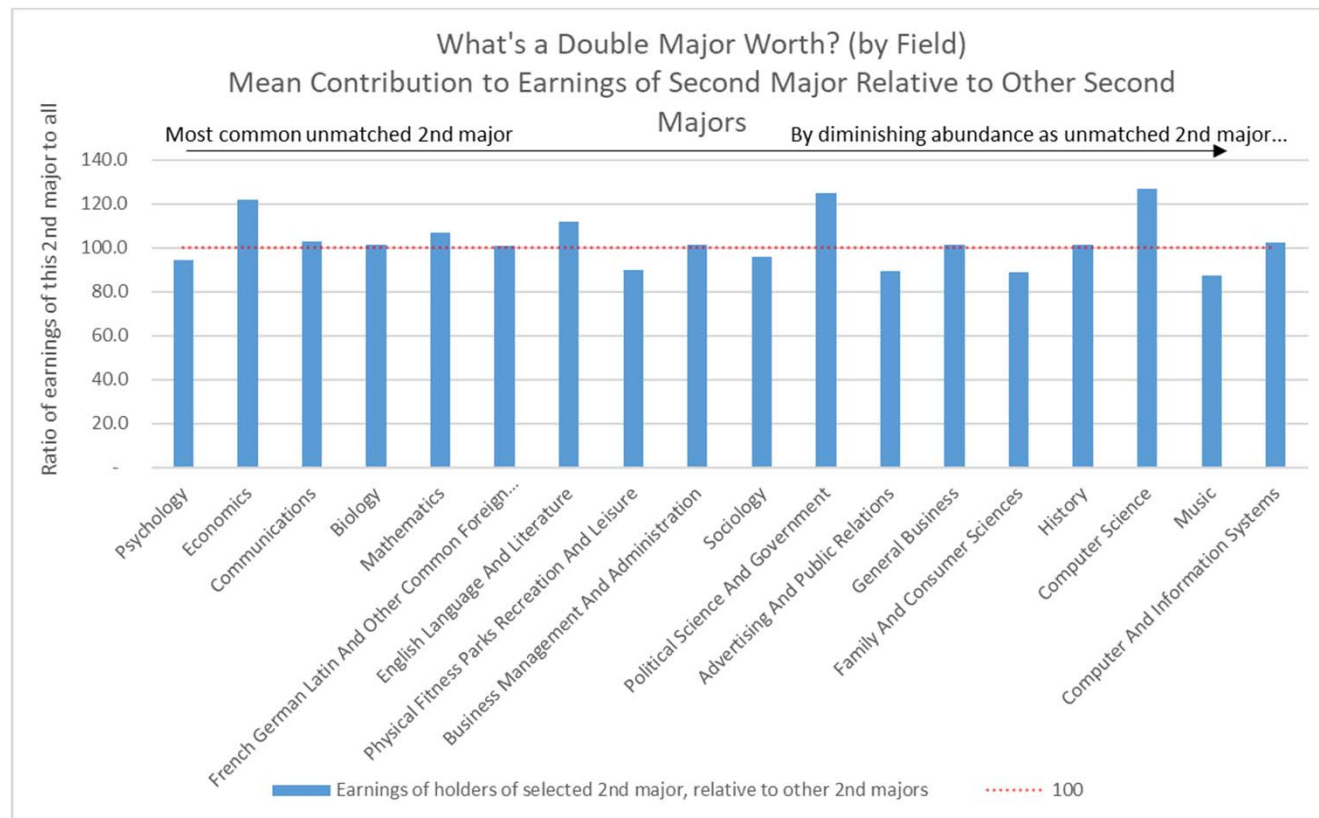
# Do People Work in their Fields?

## College Majors With the Largest Share of Graduates Working in Related Jobs



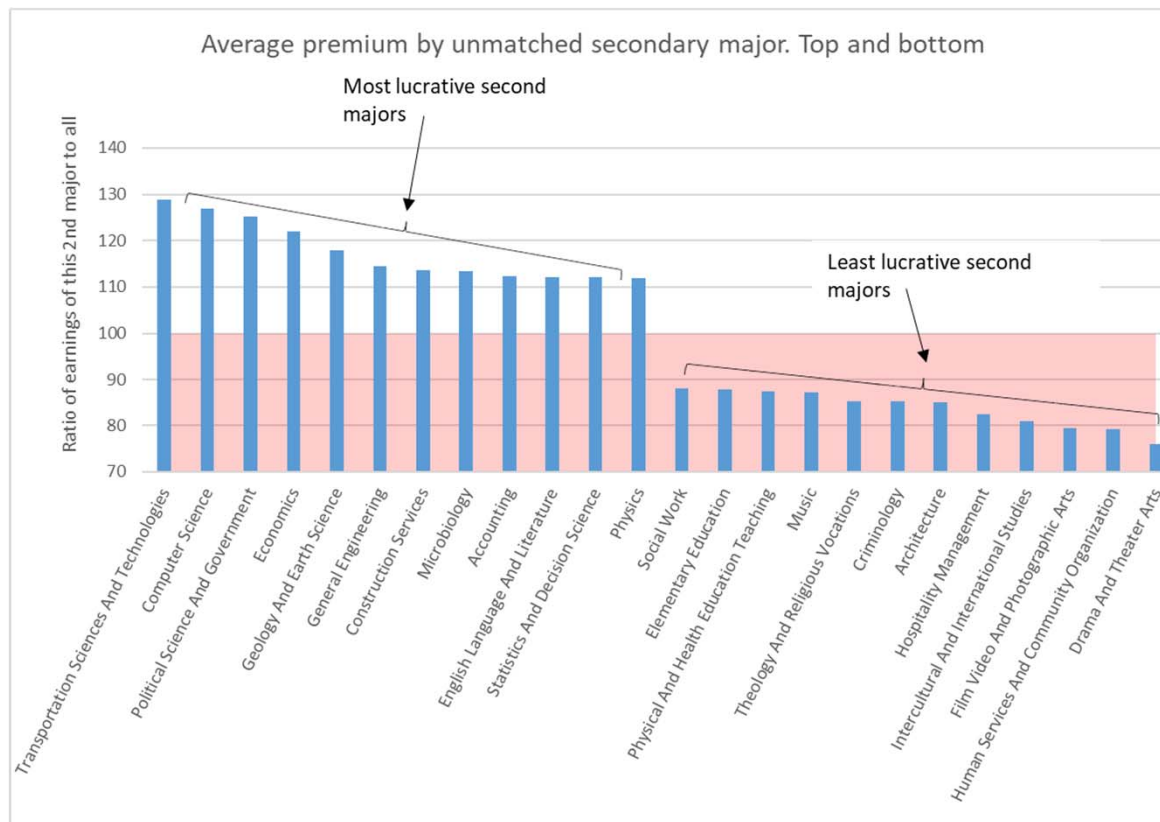
## Do People Work in Their Fields?

The Earnings Premium for Second Majors Not Directly Applied on the Job

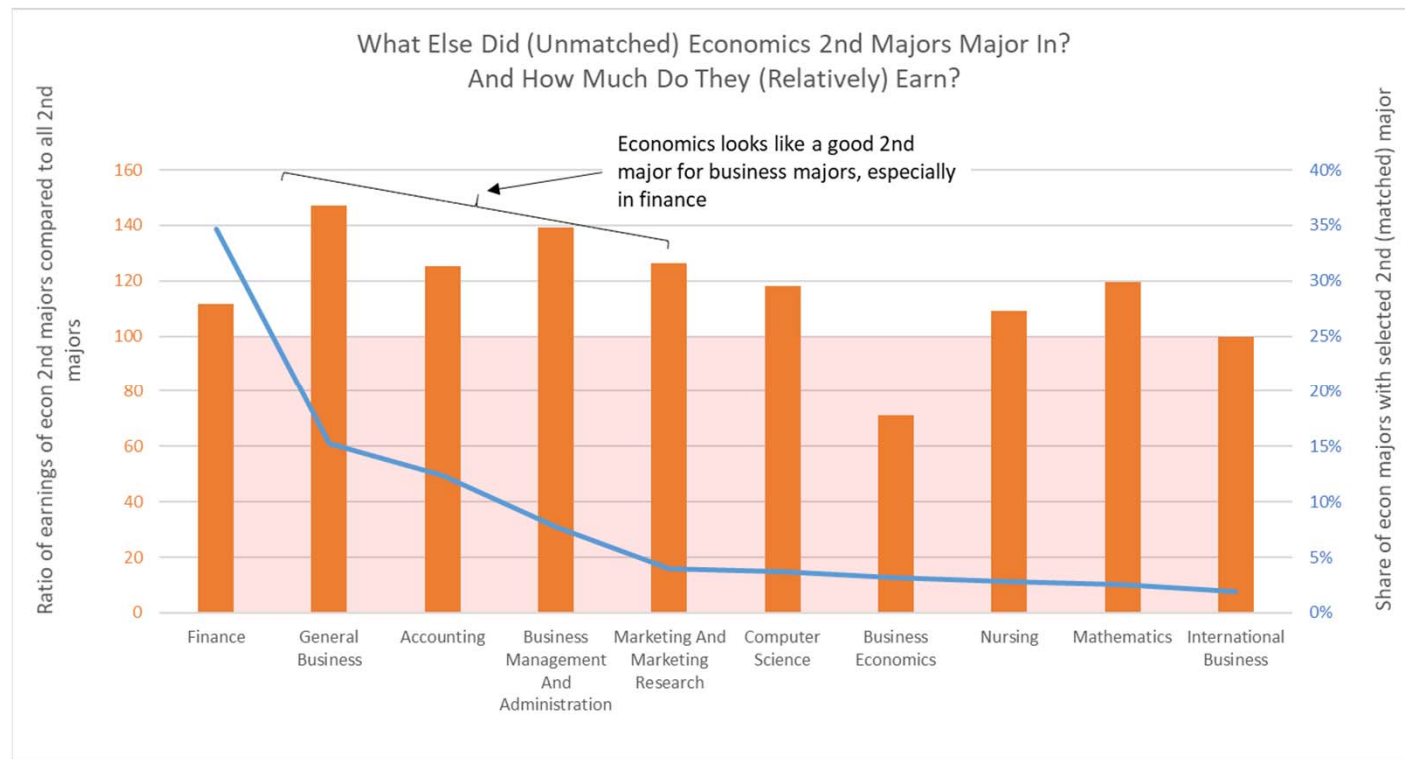


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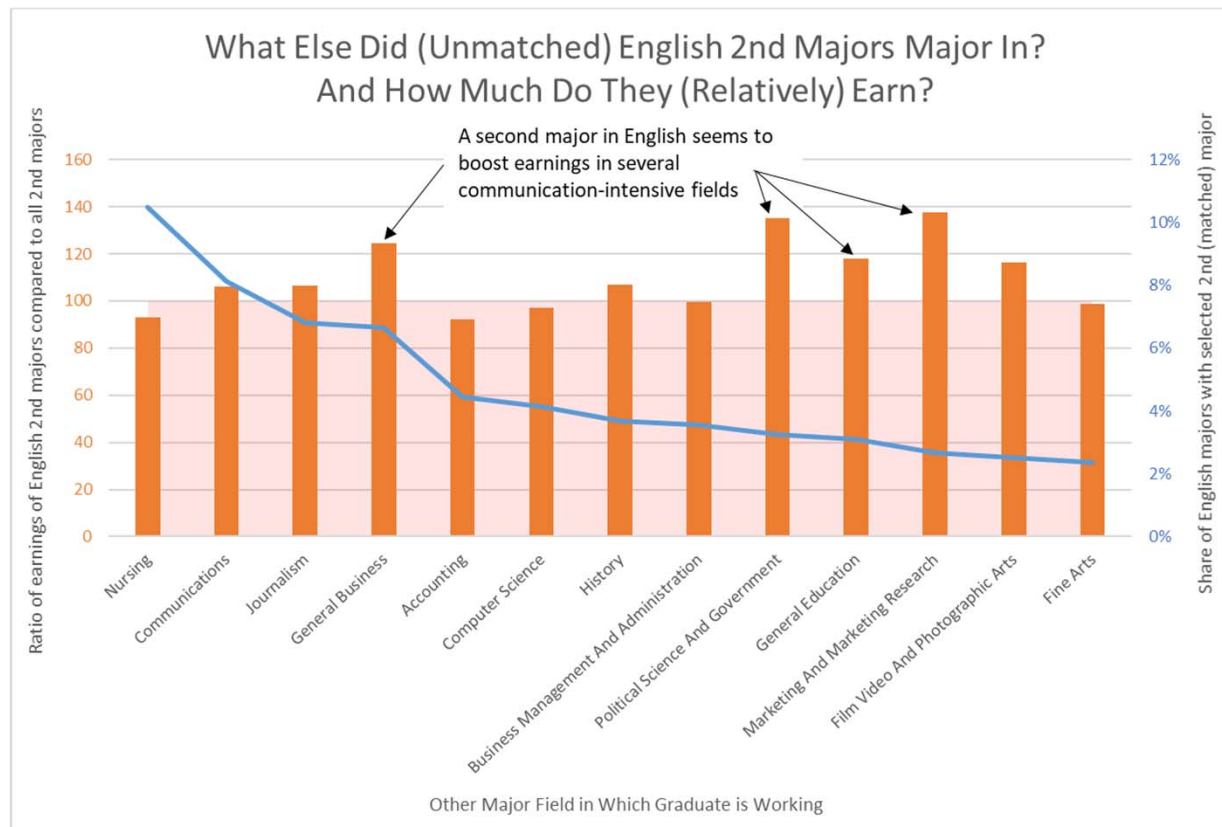


# The Indirect Value of a Major: Economics

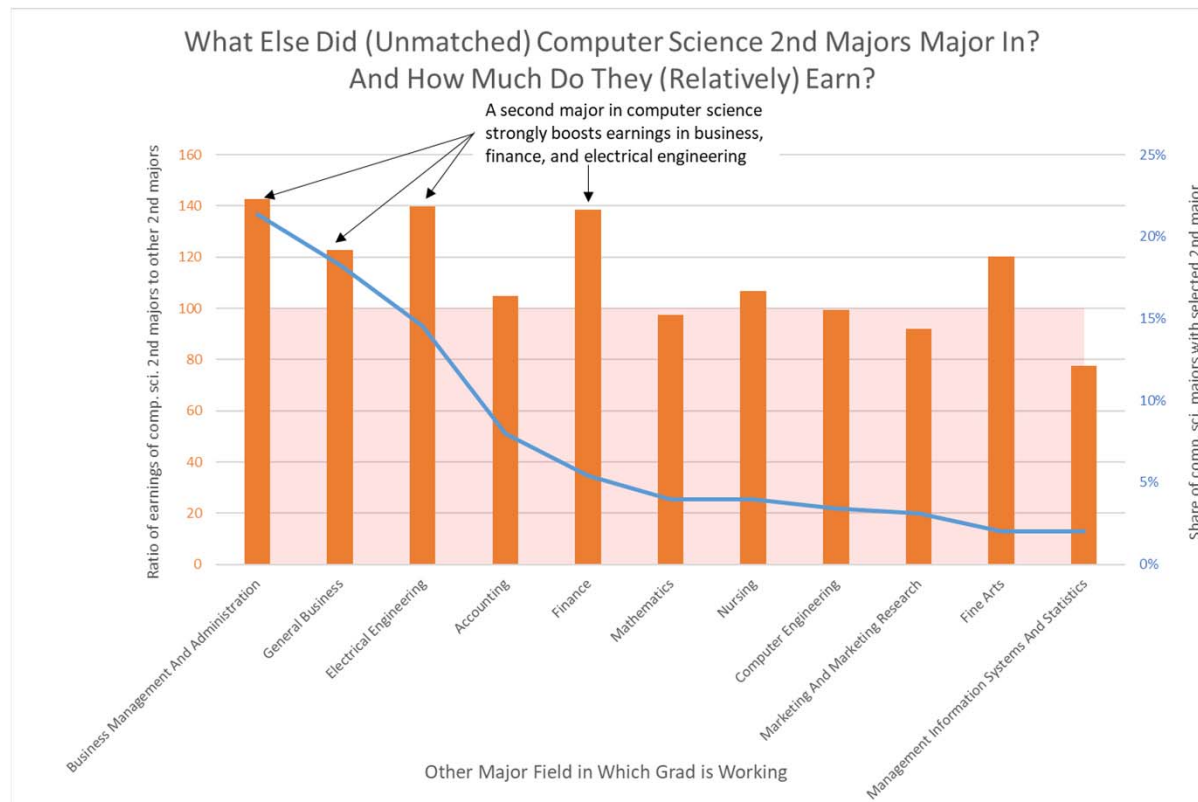




# The Indirect Value of a Major: English



# The Indirect Value of a Major: Computer Science



# Do People Work in Their Fields?

- Why might college educated people earn more if they're not working in their fields?
  - College might provide human capital of a more *general* kind, e.g., critical thinking skills, intellectual self-confidence, “learning to learn”
  - Signaling or ability bias
  - These are quite distinct causal stories but difficult to distinguish empirically