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## Demographics, Skills Gaps, and Market Dynamics

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# Demographics, Skills Gaps, and Market Dynamics

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July 30, 2013, Washington D.C.

# Outline

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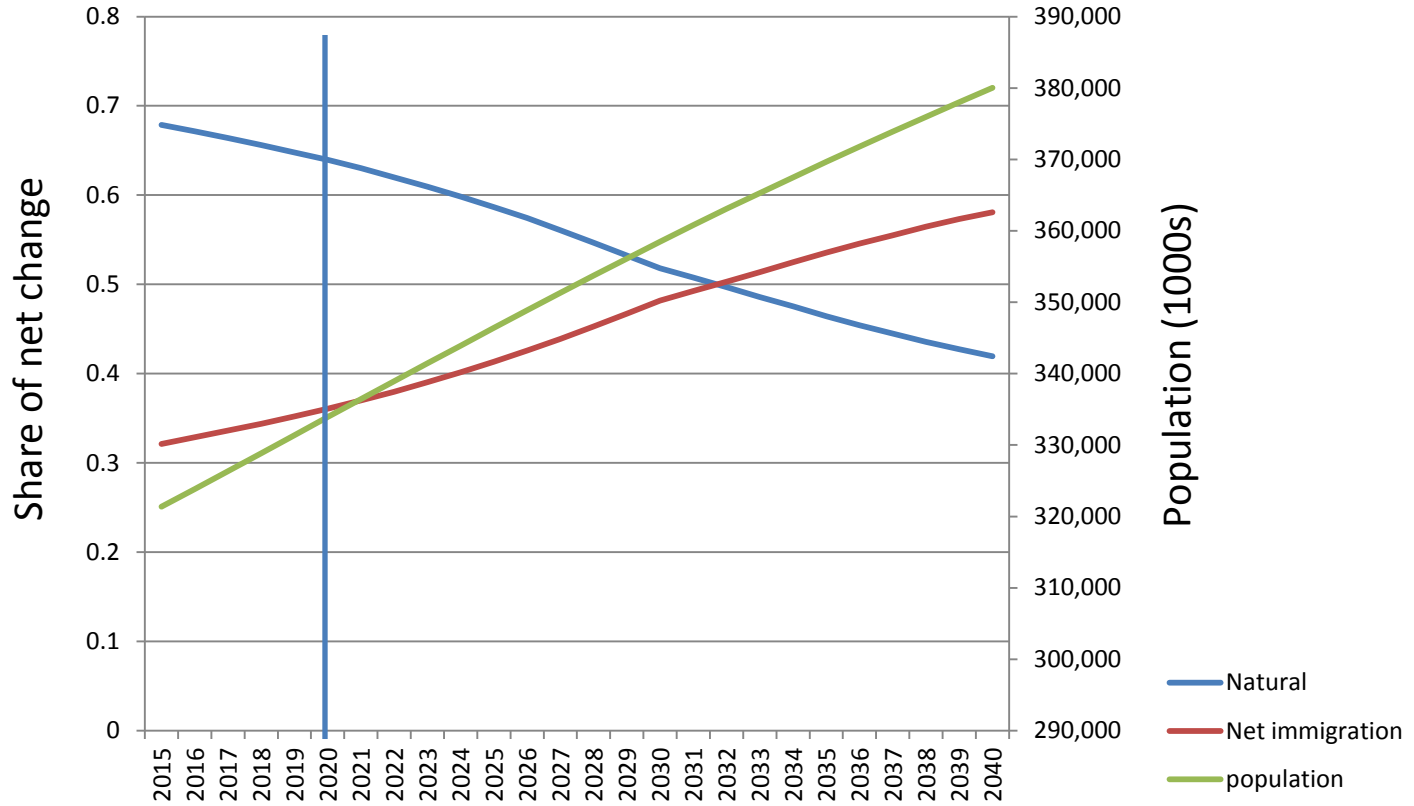
- Focus on the question of possible labor shortages
  - Long term: Baby boomers retiring raising the question of enough skilled workers to replace them
  - Short term: Employers complain they can't find enough qualified workers
- Long Term
  - Employment Projections
  - Educational needs projections
  - Educational attainment projections
- Short term
  - Evidence of Skill Gaps
  - Market Dynamics

# Population Trends

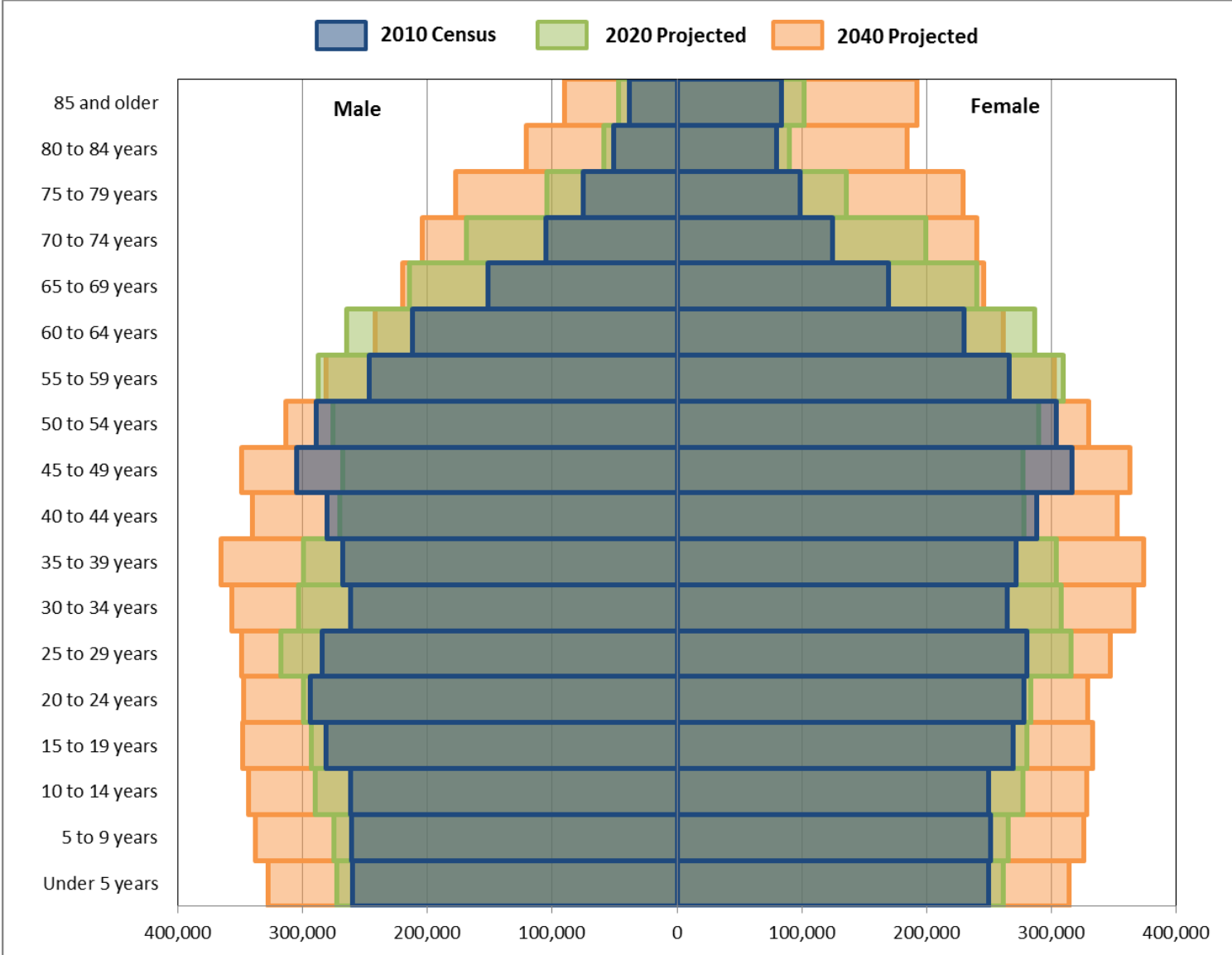
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- Population is becoming:
  - Larger
  - Older
  - More diverse with respect to race and ethnicity
- Birth rates expected to continue to fall
- Death rates steady but expected to increase slightly in later years
- Immigration as share of net population increase continues to rise and will overtake natural population increase as a share by 2032

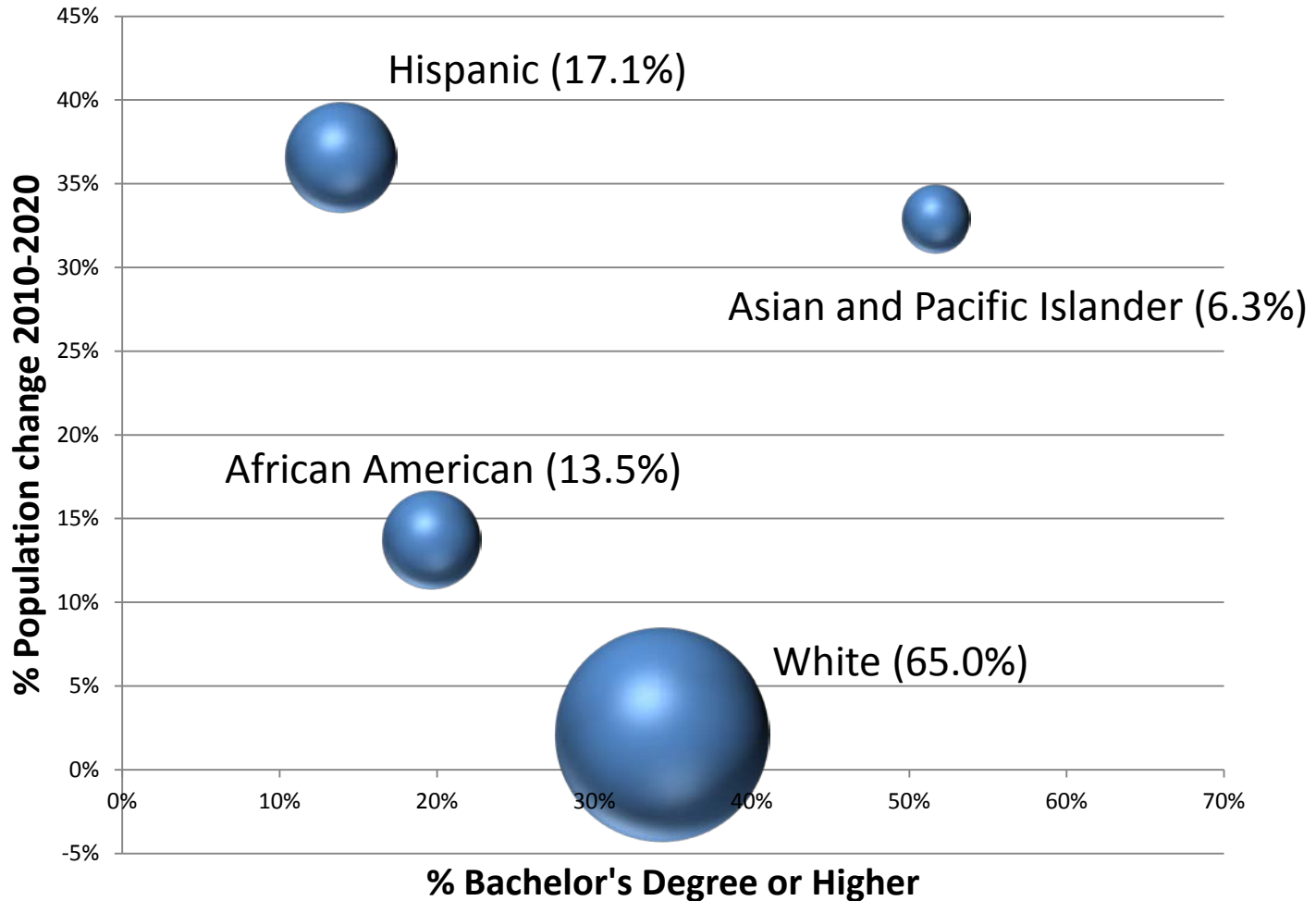
## Projected Population and its Components, 2015-2040



Source: U.S. Census Bureau, Population Division, Release Date: December 2012



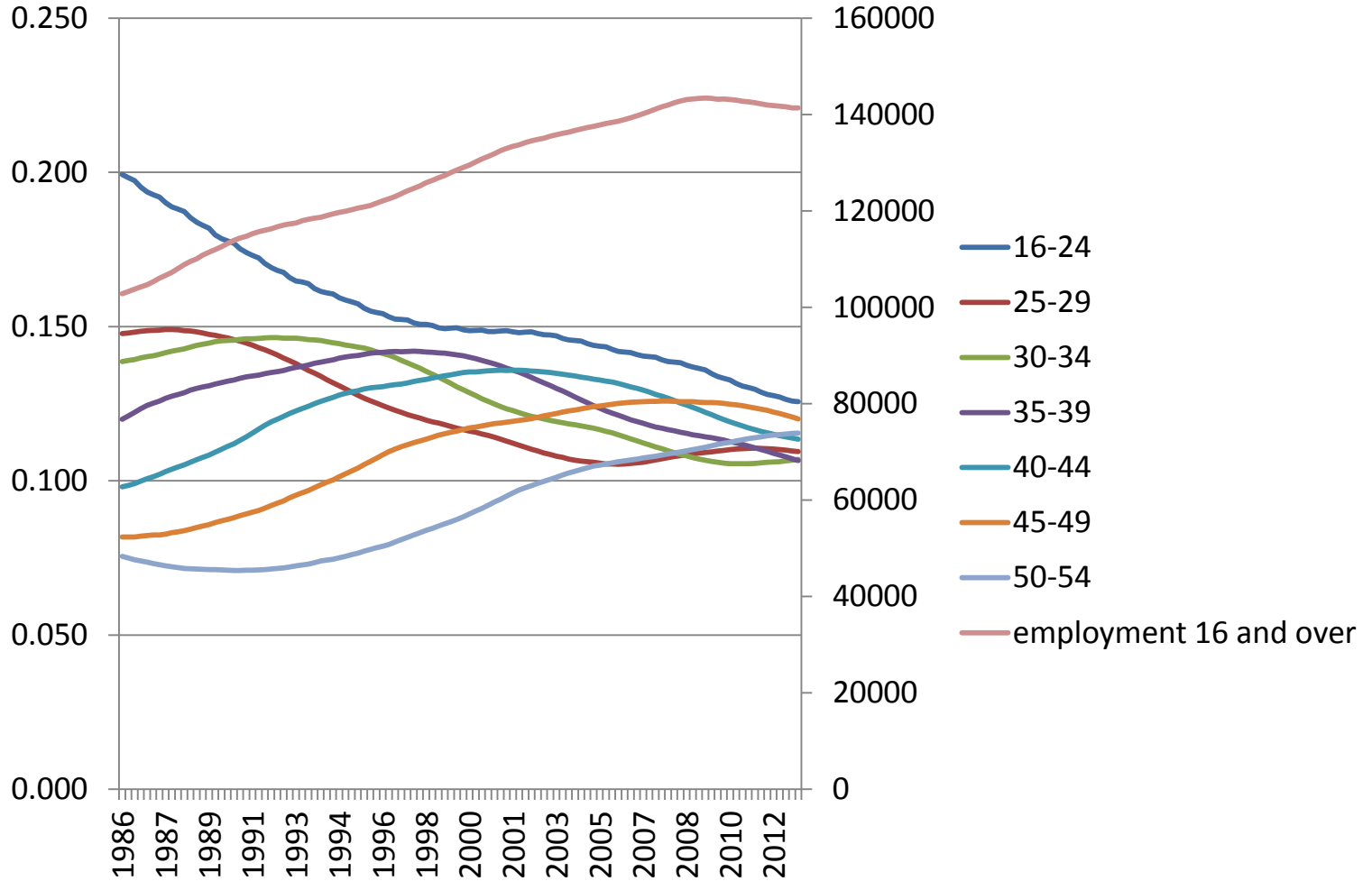
# Education attainment and population change



Source: Census; bubble size reflects share of population

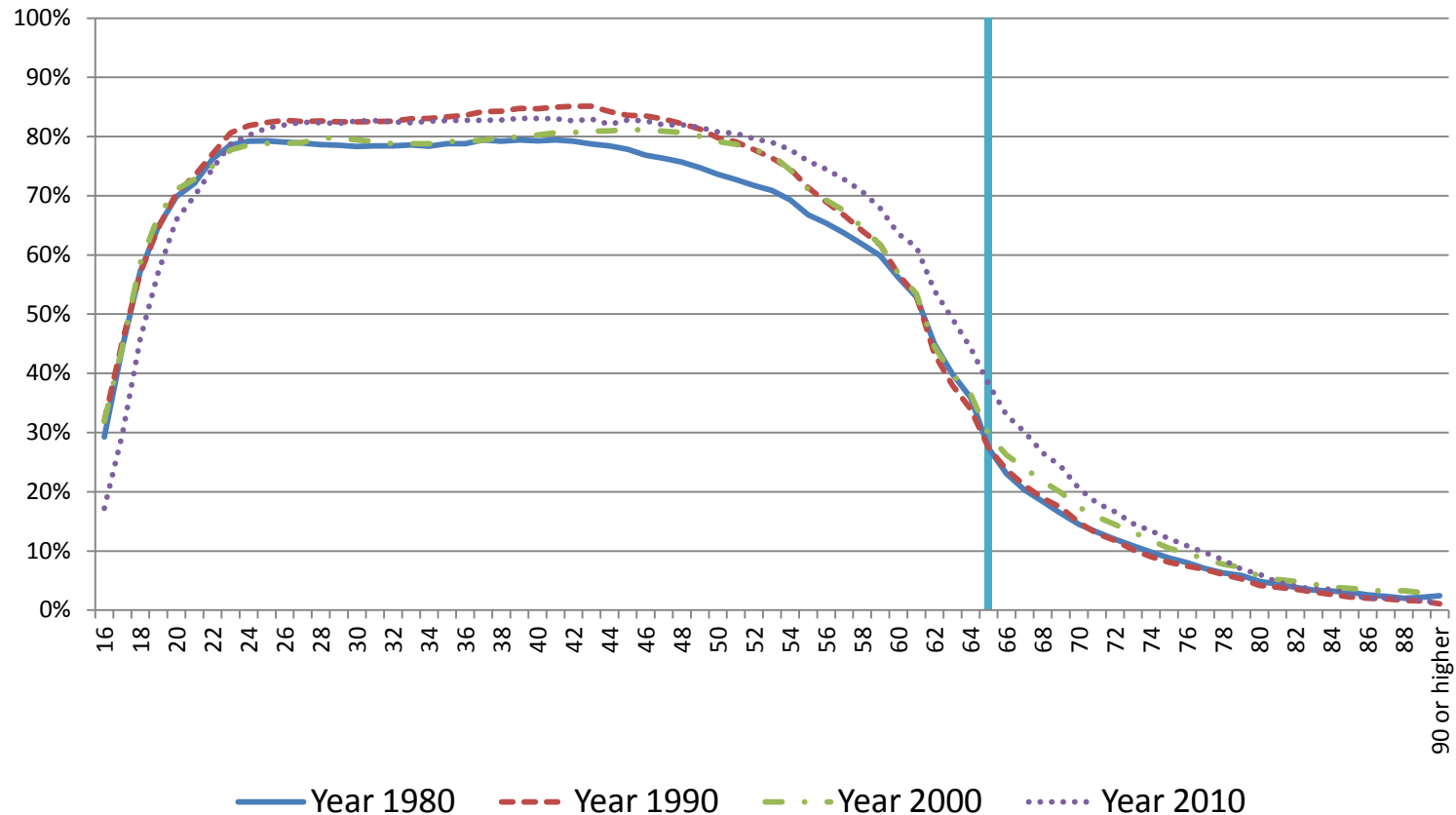


# Total Employment 16 and over and Age Components



Source: BLS, selected years, 5-year moving averages

# Labor Force Participation Rate by Age, selected years



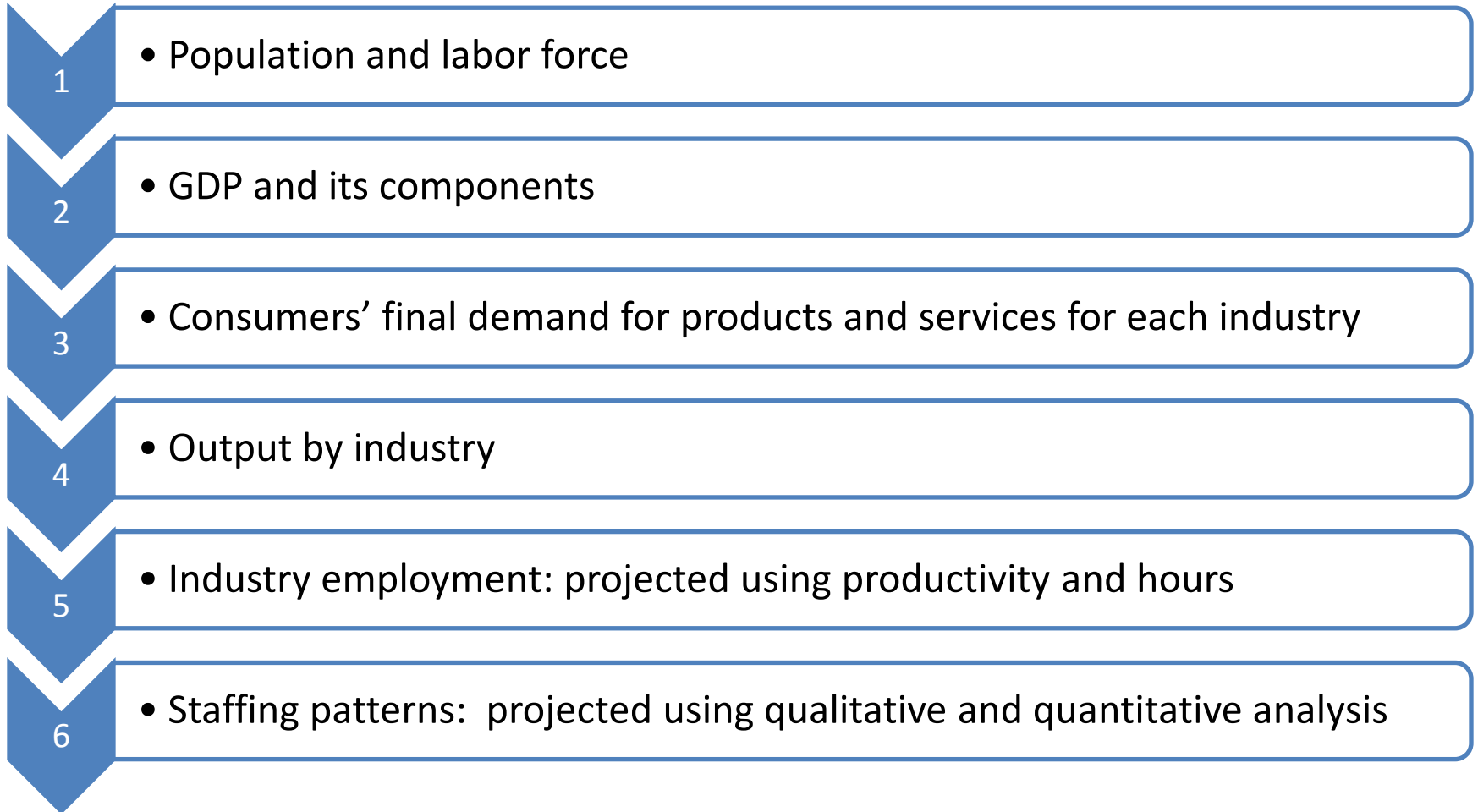
Source: BLS, selected years

# Long-Term Demand and Supply Projections: Putting together the parts

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- Demand for skills (educational attainment)
  - Demand for jobs by occupations (BLS projections)
  - Skills requirements of occupations
    - Educational requirements (BLS, O\*NET, Job Openings)
    - Current and in the future (examine educational attainment of job holders over time)
  - Adjust for multiple job holders
    - Convert jobs to workers
- Supply of skills (educational attainment)
  - Population trends by race/ethnicity, gender, age group
  - Educational attainment by race/ethnicity, gender, age group
  - Convert population to workers (labor force participation rates)

# BLS Occupation Projections



# Education Requirements

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- BLS (MLR, Sommers and Morisi, April 2012)
  - New BLS education categories provide information on the typical path to enter an occupation
  - Defined as the typical level most workers need to enter; could be multiple paths
  - Examined educational attainment of younger workers (18 to 29)
  - Used O\*Net, based on a survey of workers in the occupation and industry experts
  - Interviewed persons who were knowledgeable about education and training requirements

# Education Requirements

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- O\*NET (U.S. Department of Labor)
- Provides required level of education on 950 occupations in US economy
- Asks incumbent worker *“If someone were being hired to perform this job, indicate the level of education that would be required”*
- Education and training information provided through a survey of targeted job incumbents

# Education Requirements

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- Web job postings
- A large number of job openings are posted on the internet
- Measure is more like BLS in determining the pathways to the occupation (minimum education requirement)
- Several companies have devised search engines to “spider” the web in search for job postings
- Burning Glass (and others, such as the Conference Board) have developed algorithms to reduce duplication
- Use Burning Glass to glean the educational requirements stated on job postings by occupation

# Education Attainment

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- American Community Survey (U.S. Census)
- Household survey of sample of US households
- Provides actual education level of individuals holding jobs in each occupation



# Comparison of BLS and O\*Net Education Designation (Number of occupations)

BLS designation

O*NET designation	LT HS	HS	Some college no degree	Assoc. Degree	BA	MA	Doctorate or professional degree
less than high school diploma	0.441	0.056	0.143				
high school diploma (or GED or HS equivalence cert.	0.505	0.713	0.143	0.136	0.027		
Post-secondary certificate after high school	0.032	0.056	0.143	0.068	0.022		
Some College courses	0.011	0.034		0.051	0.016		
Associate's degree		0.065	0.143	0.424	0.022		
Bachelor's degree	0.011	0.104	0.429	0.288	0.815	0.118	0.040
Post-BA certificate					0.005	0.059	
Master's degree				0.034	0.076	0.588	0.120
Post-Master Certificate						0.029	
First professional degree requires at least 2 years							0.040
Doctoral degree					0.016	0.176	0.400
Post-doctoral training						0.029	0.400
# occupations	93	356	7	59	184	34	25

## Comparison of BLS and O\*Net Education Designation (Number of jobs)

% educational attainment	BLS Designation							
	LT HS	HS	Postsec non-degree award	Some college no degree	Associate degree	BA	MA	Doctorate or professional degree
LT HS	9445	6732	0	12	169	273	18	2
HS	17249	24768	0	61	1072	2086	94	4
Postsec non-degree award	0	0	0	69	1520	0	0	0
Some college no degree	8573	20266	0	25	1081	3741	179	11
Associate degree	2351	7066	0	70	1602	2089	128	15
BA	3321	12228	0	19	416	12412	638	191
MA	498	2834	0	3	101	6021	1008	238
Doctorate or professional degree	137	578	0	3	101	1053	217	911

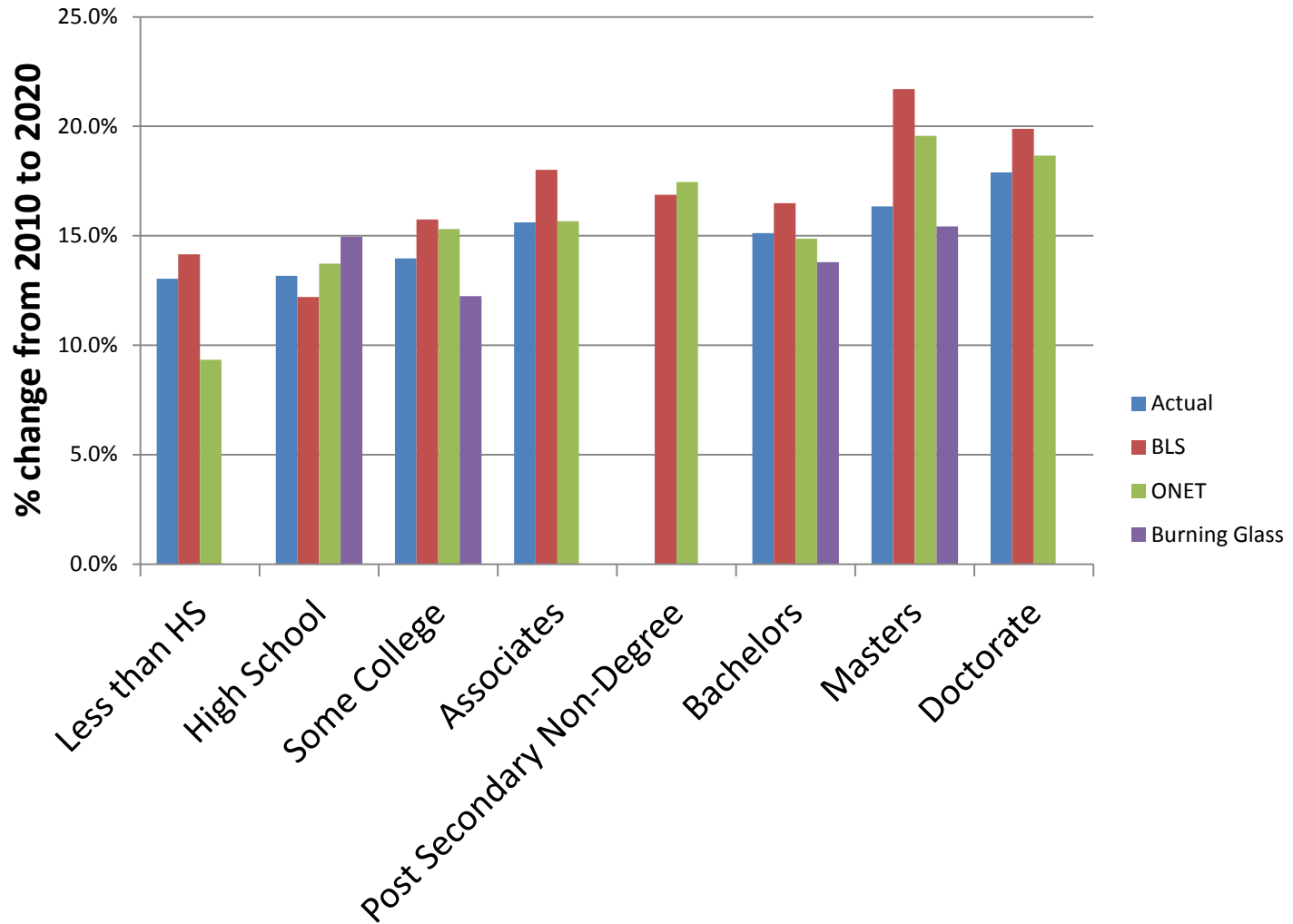
median annual wage

21359      37518      35617      36682      65515      66482      61737      95571

number workers

41,561      74,473      -      259      5,957      27,674      2,281      1,372

# Projected Growth in the Demand for Education Requirements



Based on BLS Employment projections 2010-2020 and various sources of education requirements

# Projected Supply and Demand for Education Year 2020

	HS or less	Some college	Associate's degree	Bachelor's degree	Master's degree	Doctorate /professional degree	Total
Supply	59548	44437	16096	34795	13622	5338	173837
Demand							
BLS	97100	7603	9123	24981	2338	5112	146257
O*NET	83464	14957	3431	34176	4203	2284	142515
Burning Glass	65702	16618		42118	18305		142743
2010 Actual	55871	34667	13993	29639	11546	5255	150970

Source: Supply, extrapolate Neumark et al. 2011 from 2018 to 2020  
 Demand, BLS (Sommers and Morisi, MLR, April 2012)  
 O\*Net (U.S. Department of Labor)  
 Actual (ACS, U.S. Census)

Note: Number of workers in 1000s

# Supply minus Demand for Education, Projection to Year 2020

	HS or less	Some college	Associate's degree	Bachelor's degree	Master's degree	Doctorate /professional degree	Total
BLS	-37551	36834	6973	9814	11285	226	27581
% diff	-63.1%	82.9%	43.3%	28.2%	82.8%	4.2%	15.9%
O*NET	-23915	29480	12665	619	9420	3054	31323
% diff	-40.2%	66.3%	78.7%	1.8%	69.1%	57.2%	18.0%
Burning Glass	-6153	-43916		-7232	656		31095
%diff	-10.3%	72.6%		-21.1%	4.81%		17.9%
2010 Actual	3678	9770	2103	5156	2077	83	22867
%diff	6.2%	22.0%	13.1%	14.8%	15.24%	1.56%	13.2%

Source: See previous slide

# Projected Supply and Demand for Education, Year 2020

## Share of total number of workers

	HS or less	Some college	Associate's degree	Bachelor's degree	Master's degree	Doctorate /professional degree	Total
Supply	0.343	0.256	0.093	0.200	0.078	0.031	1
Demand							
BLS	0.664	0.052	0.062	0.171	0.016	0.035	1
O*NET	0.586	0.105	0.024	0.239	0.029	0.016	1
Burning Glass	0.460	0.116		0.295	0.128		1
2010 Actual	0.370	0.230	0.093	0.196	0.076	0.035	1

Source: See previous slide

# Supply Share minus Demand Share

	HS or less	Some college	Associate's degree	Bachelor's degree	Master's degree	Doctorate /professional degree
BLS	-0.321	0.204	0.030	0.029	0.062	-0.004
O*NET	-0.243	0.151	0.069	-0.040	0.049	0.015
Burning Glass	-0.118	0.232		-.095	-.019	
2010 Actual	-0.028	0.026	0.000	0.004	0.002	-0.004

Source: See previous slide

# Summary

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The projections point to a shortage in 2020 of:

- Workers with BA degrees
  - O\*Net and Burning Glass
- Workers with Doctorate or professional degrees could be in short supply when measured as share of projected workforce in 2020 (BLS and Actual) but in terms of numbers of workers a slight surplus in 2020
- Workers with only a high school degree (BLS and O\*Net)
  - Some of this shortage may be due to how multiple job holders are factored into the projections

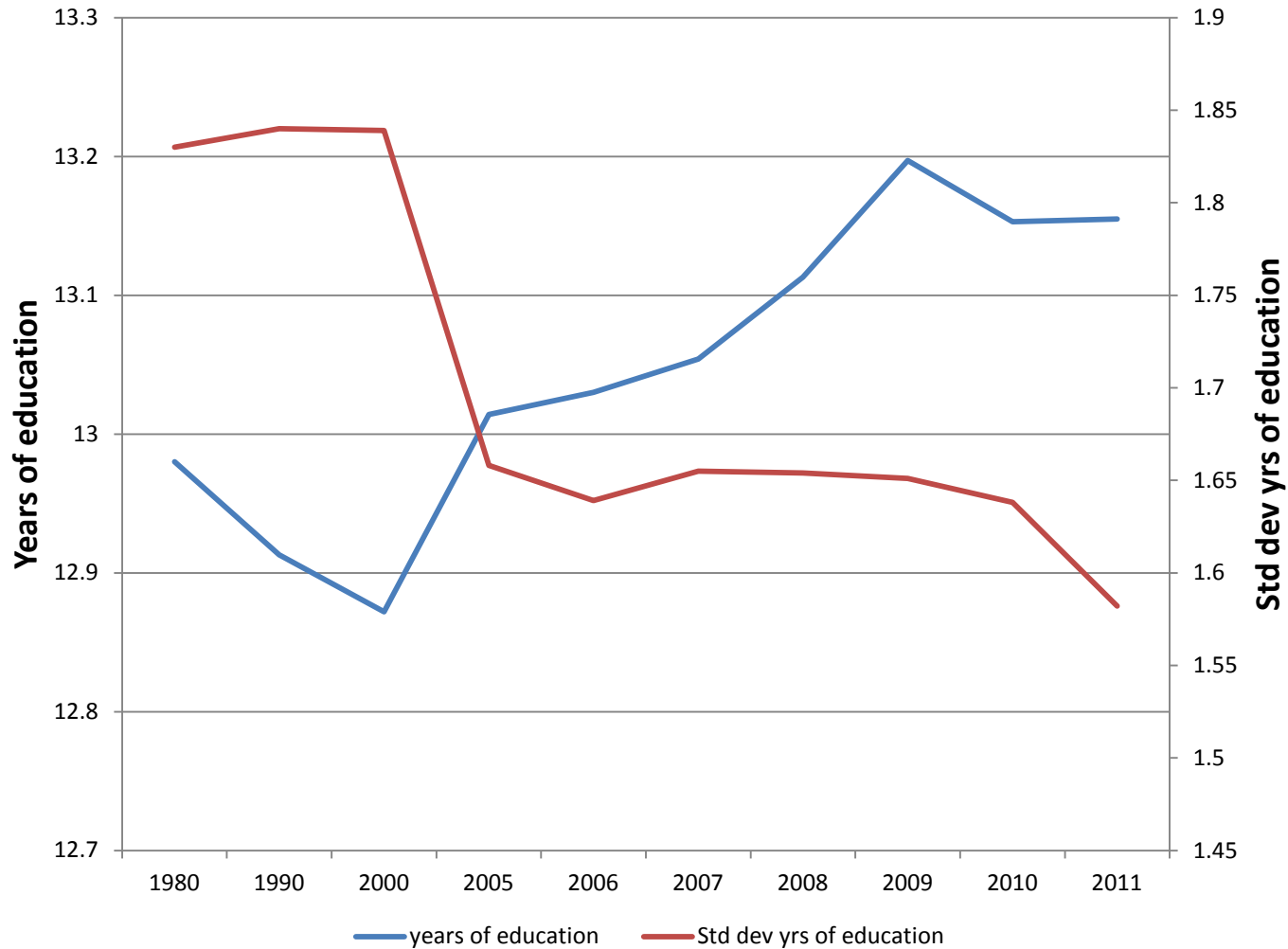


# Change in Education Requirements

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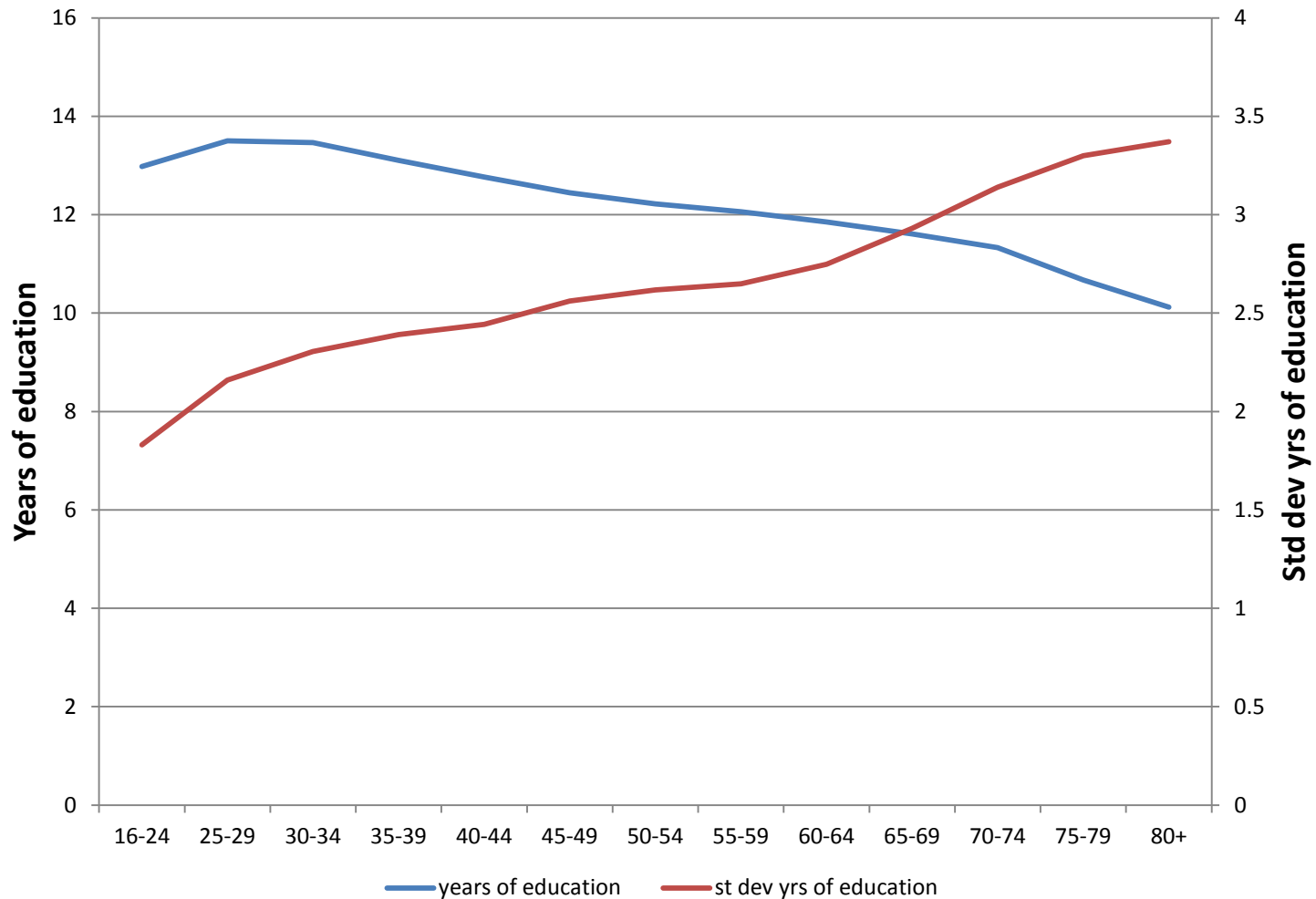
- Methodology for education projections assumes education requirements by occupation are unchanged between 2010 and 2020
- Is this a fair assumption?
- Track actual education attainment by age and occupation from 1980 through 2011

Education attainment is trending upward as standard deviation is declining.



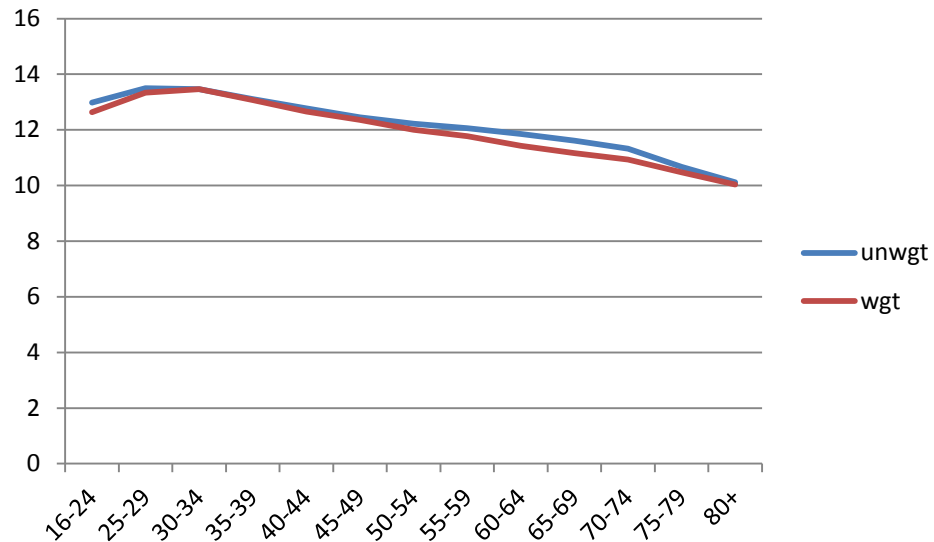
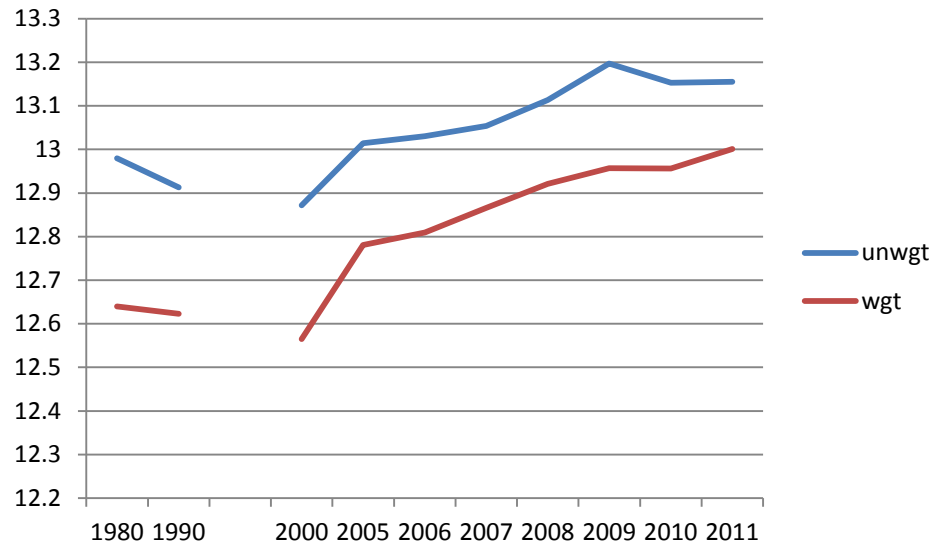
Source: Analysis of ACS holding years constant

Education attainment declines with age while the dispersion of education within occupations increases.

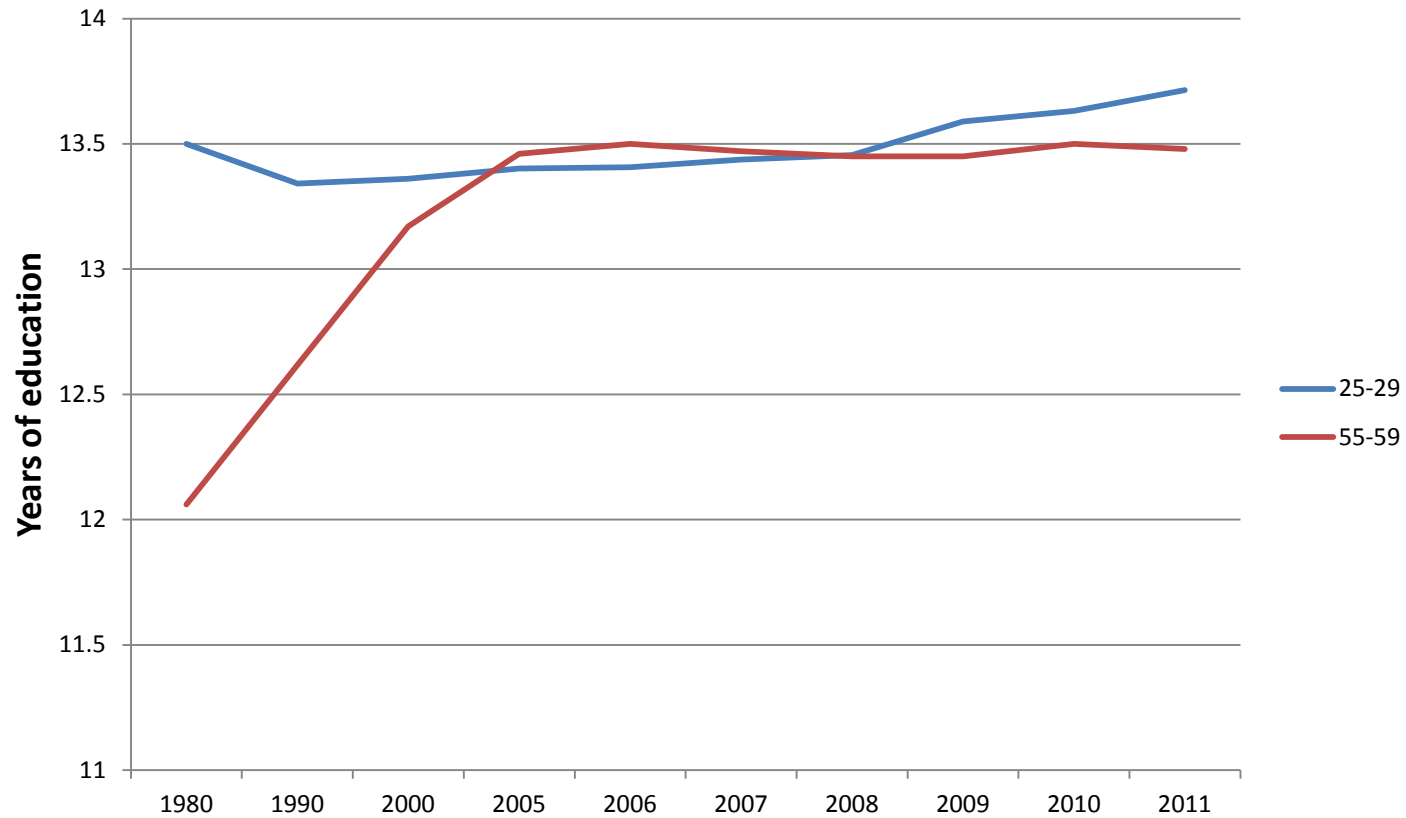


Source: Analysis of ACS holding years constant

Weighting does not make much difference in terms of trends or age profile of education attainment



Except for a catching up period by older workers in the 1980s and 90s, education attainment has remained fairly steady. Education attainment of those first entering the labor force is particularly steady except for the recession period in which poor job prospects may be a factor.



Source: Analysis of ACS for selected age groups

# Change in Years of Education by Age Cohort from 1990 to 2010

Age/Period		1990-2000	2000-2010	1990-2010
25-29	unwgt	0.020	0.270	0.290
	wgt	0.217	0.456	0.673
40-44	unwgt	-0.067	0.128	0.061
	wgt	-0.124	0.396	0.272
55-59	unwgt	0.553	0.290	0.883
	wgt	0.864	0.500	1.36

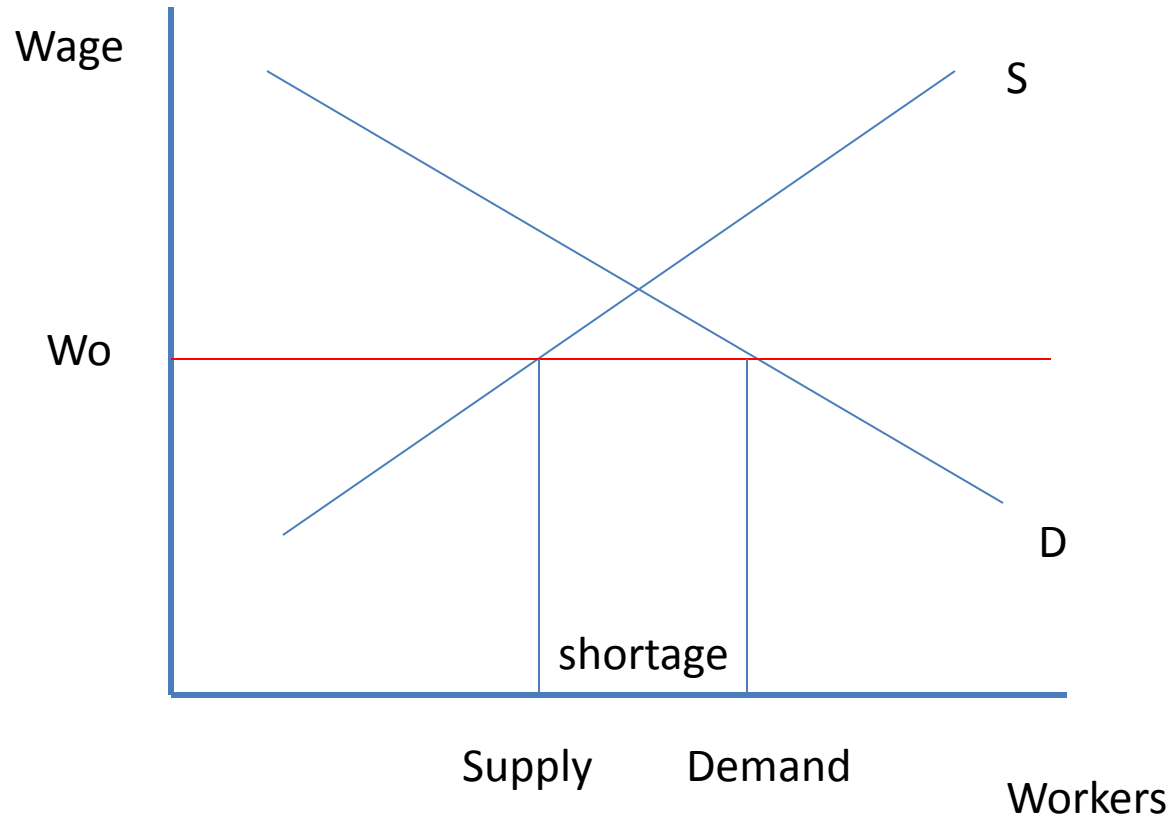
Source: American Household Survey, U.S. Census

# Short-term Shortages?

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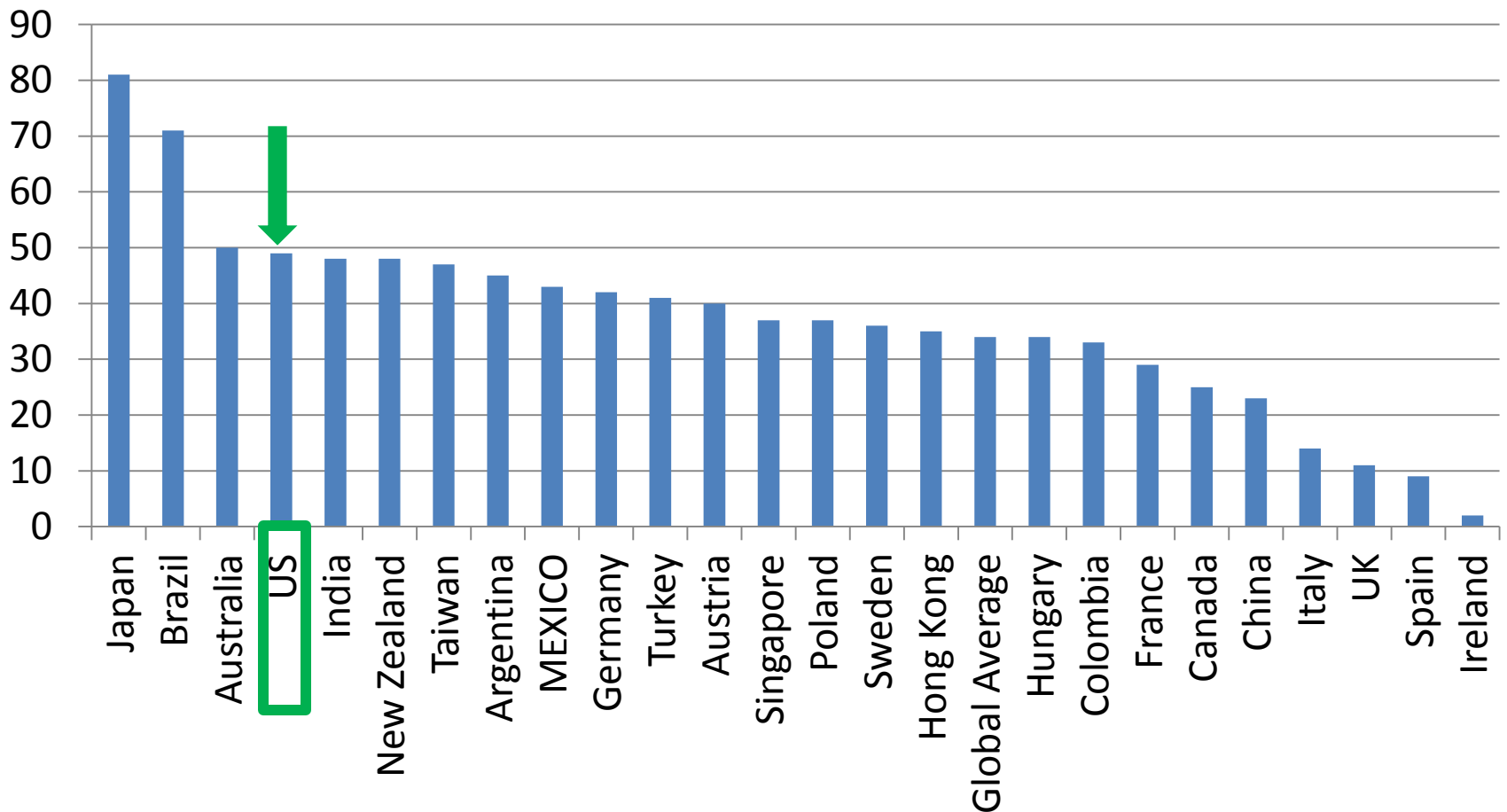
- Seems like growing complaints from employers that they can't find qualified workers
- Surveys point to shortages
- New York Fed study concluded that mismatch accounted for up to a third of the 5.4 ppt. increase in unemployment rate during recession
- Structural changes (decline in construction during recession); lack of mobility due to housing slump; reluctance to hire unemployed workers
- Question should be “can't find qualified workers at such-and-such wage”

# Economics of Labor Shortage





# Percentage of employers reporting difficulty filling jobs



Source: 2012 Talent Shortage Survey Research Results, Manpower

# Top 10 jobs employers are having difficulty filling

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1. Skilled trades workers
2. Engineers
3. IT staff
4. Sales representatives
5. Accounting and finance
6. Drivers
7. Mechanics
8. Nurses
9. Machinists/machine operators
10. Teachers

Source: 2012 Talent Shortage Survey Research Results, Manpower

# Difficulty finding qualified workers

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## Reasons for difficulty finding qualified workers

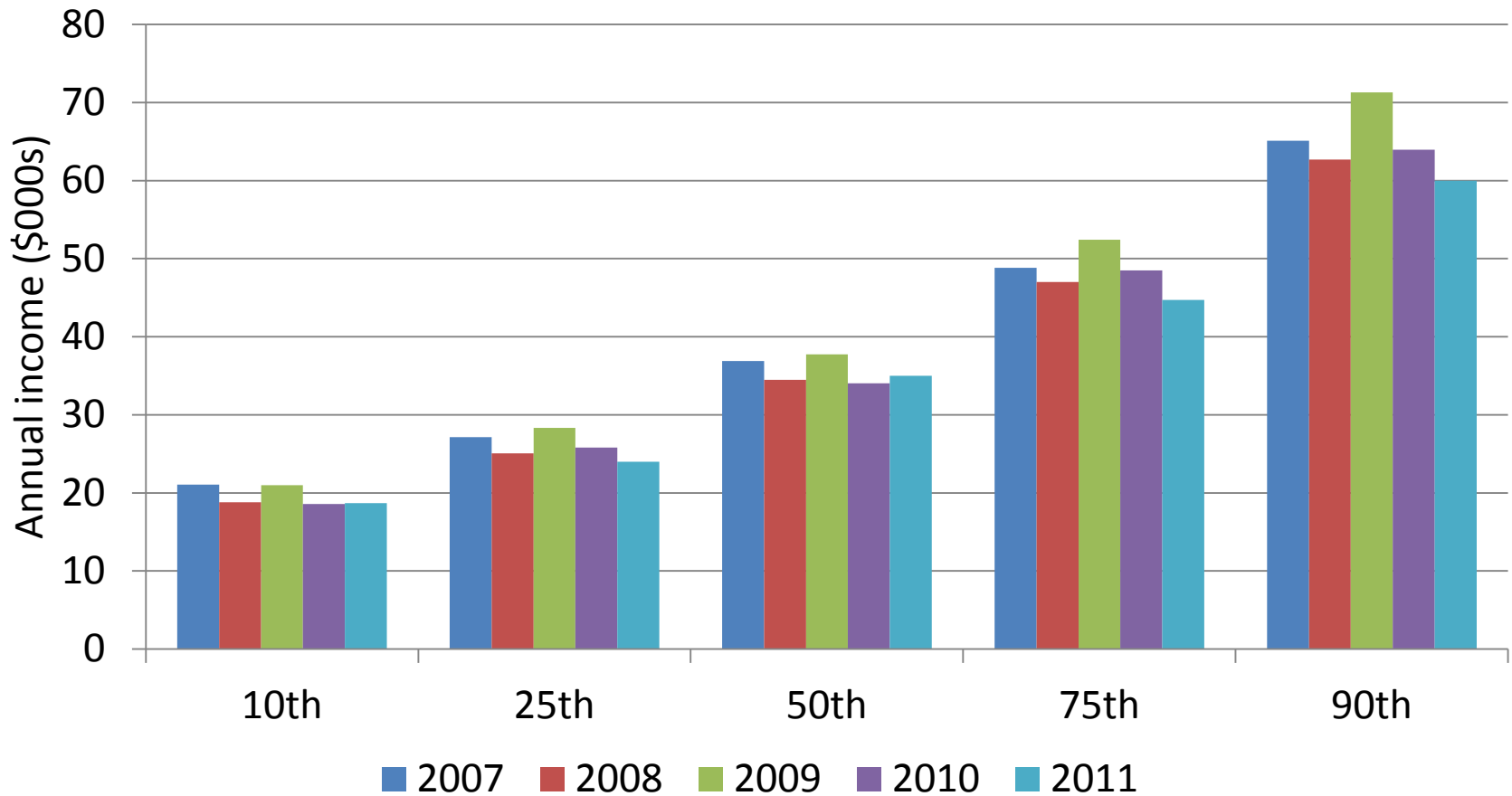
- Lack of available applicants (36%)
- Lack of technical competencies (36%)
- Lack of experience (31%)
- Looking for more pay (19%)
- Lack of employability skills (15%)

## Strategies to address difficulty finding qualified workers

- Provide additional training (37%)
- Broadening search outside of local region (14%)
- Focusing on staff retention (13%)
- Increasing starting salaries (11%)
- Partnering with education institutions (10%)

Manpower Survey 2012

## Income of Full-Time Production Workers (2011 Dollars)



# Summary

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- Fastest projected growth is for higher education degrees—master's and doctorate degrees
- Still high demand for high school education, leading to projected shortages in workers with only a high school education
- Slight increase in education attainment, but much could be the result of surplus labor during the recession
- Employers complain of short-term shortages, which may not be surprising as real wages remain stagnant or are even decreasing

## Contact:

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