

Declining Employment to Population Ratios: Has Trade Played a Role?

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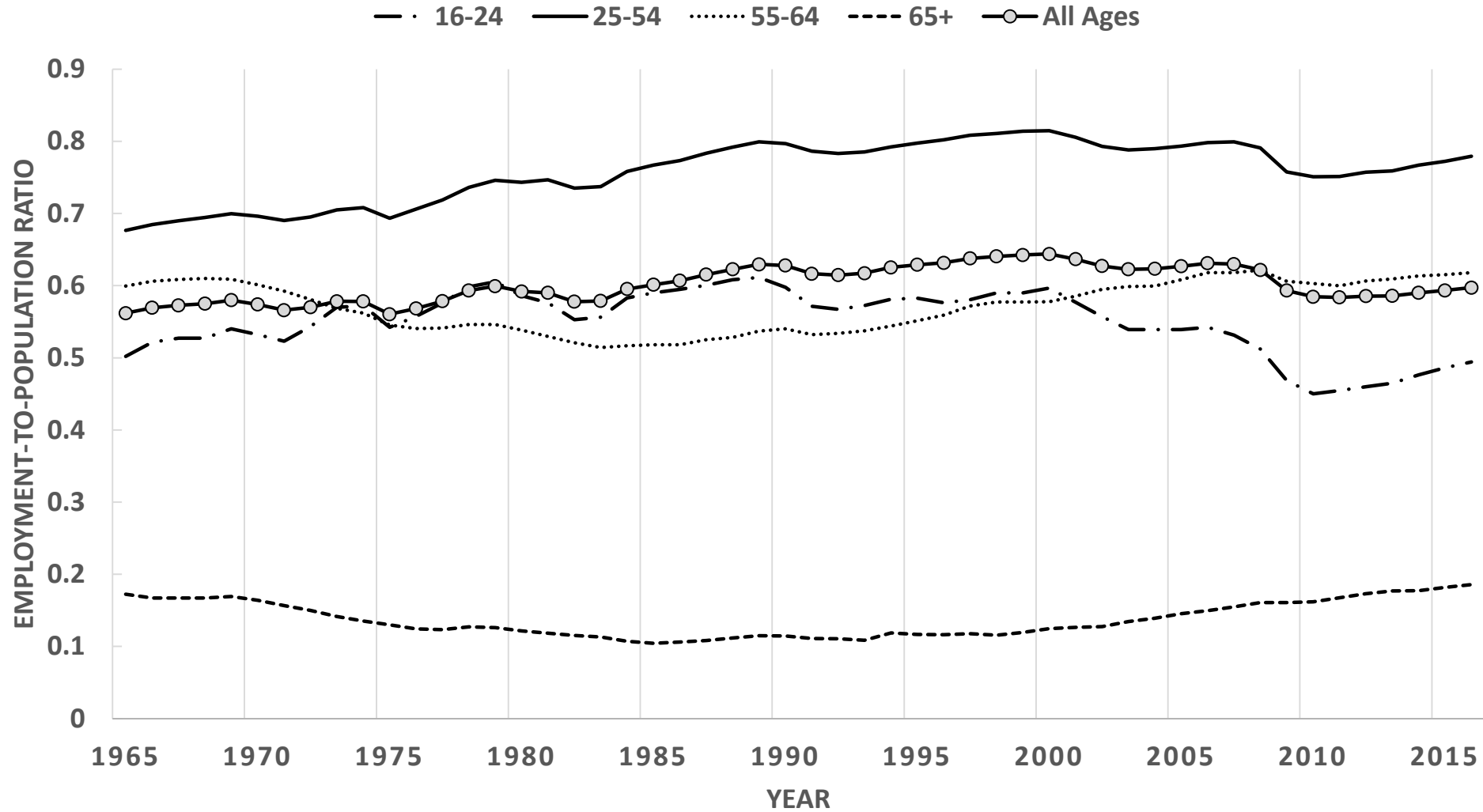
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Presentation based on work with Melissa Kearney, University of Maryland
and NBER

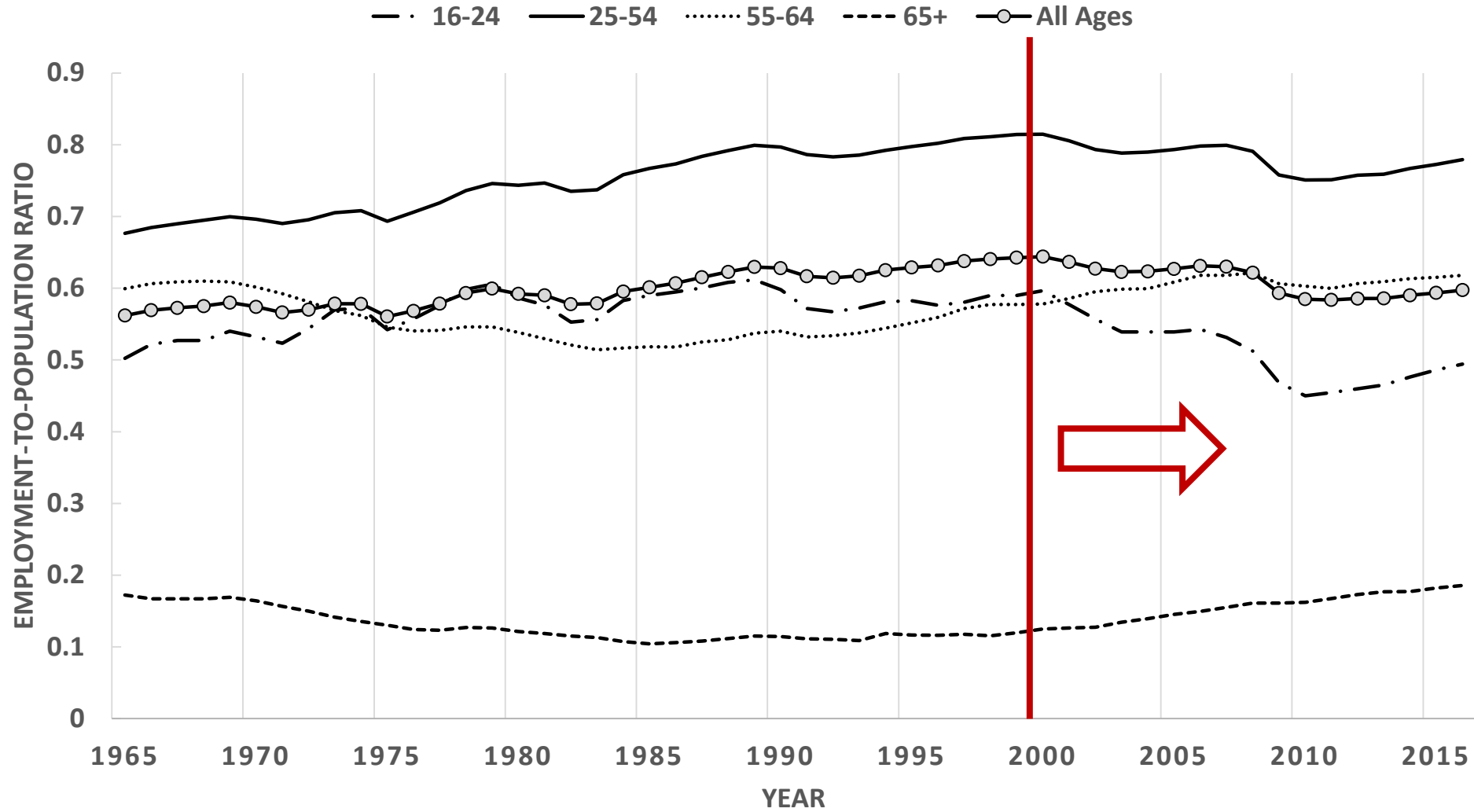
Overview

- Overall employment-to-population ration (EPOP) for those age 16 plus fell from 64.3% in 1999 to 59.7% in 2016, a 4.5 pp. decline
 - Would like to understand why this has occurred
- Plan for talk
 - Decompose how demographic shifts and within group EPOP changes have contributed to the overall EPOP decline
 - Consider broad set of potential explanatory factors for within-group EPOP declines
 - Focus on longer-term decline, not effects of the Great Recession
 - Consider whether there is convincing evidence that the factor has an effect on EPOP and whether the factor has changed in such a way that it could have caused EPOP to fall
 - For today, will emphasize evidence related to trade-related demand shocks

Employment-to-Population Ratio by Age, 1965-2016



Employment-to-Population Ratio by Age, 1965-2016



	TOTAL		MALE		FEMALE	
	E/P ₁₉₉₉	ΔE/P ₉₉₋₁₆	E/P ₁₉₉₉	ΔE/P ₉₉₋₁₆	E/P ₁₉₉₉	ΔE/P ₉₉₋₁₆
<i>Age 16-24</i>	0.590	-0.096	0.610	-0.110	0.570	-0.082
<i>Age 25-54</i>	0.814	-0.035	0.890	-0.040	0.741	-0.030
<i>Age 55+</i>	0.310	0.076	0.385	0.060	0.249	0.086
<i>Age 16-24</i>						
<i>Not In School</i>	0.726	-0.046	0.778	-0.072	0.672	-0.021
<i>In School</i>	0.443	-0.116	0.424	-0.121	0.461	-0.111
<i>Age 25-54</i>						
<i>Less than HS</i>	0.639	-0.030	0.769	-0.027	0.502	-0.046
<i>HS</i>	0.796	-0.071	0.878	-0.075	0.718	-0.086
<i>Some College</i>	0.838	-0.051	0.903	-0.049	0.781	-0.052
<i>College</i>	0.882	-0.024	0.941	-0.021	0.822	-0.017
<i>Age 55+</i>						
<i>Less than HS</i>	0.171	0.047	0.236	0.053	0.120	0.035
<i>HS</i>	0.301	0.033	0.380	0.026	0.250	0.027
<i>Some College</i>	0.364	0.048	0.426	0.032	0.315	0.061
<i>College</i>	0.464	0.024	0.516	0.013	0.395	0.051
<i>TOTAL</i>	0.643	-0.045	0.716	-0.059	0.574	-0.033

(A Simple) Decomposition

What are the contributions of changes in within-group employment rates versus changes in population shares to the overall E/POP decline?

$$\Delta(E / P)_{t_0, t_1} = \sum_i s_{i, t_0} \Delta(E / P)_{i, t_0, t_1} + \sum_i (E / P)_{i, t_0} \Delta s_{i, t_0, t_1} + \sum_i \Delta s_{i, t_0, t_1} \Delta(E / P)_{i, t_0, t_1}$$

- We define groups over sex \times age group OR sex \times age group \times education group
- Age groups used for decomposition are 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, and 75+ years
- Education groups are in/out of school (under age 25) OR <HS, HS Graduate, Some College, College Graduate (age 25 and older)

(A Simple) Decomposition by Sex and Age: Results

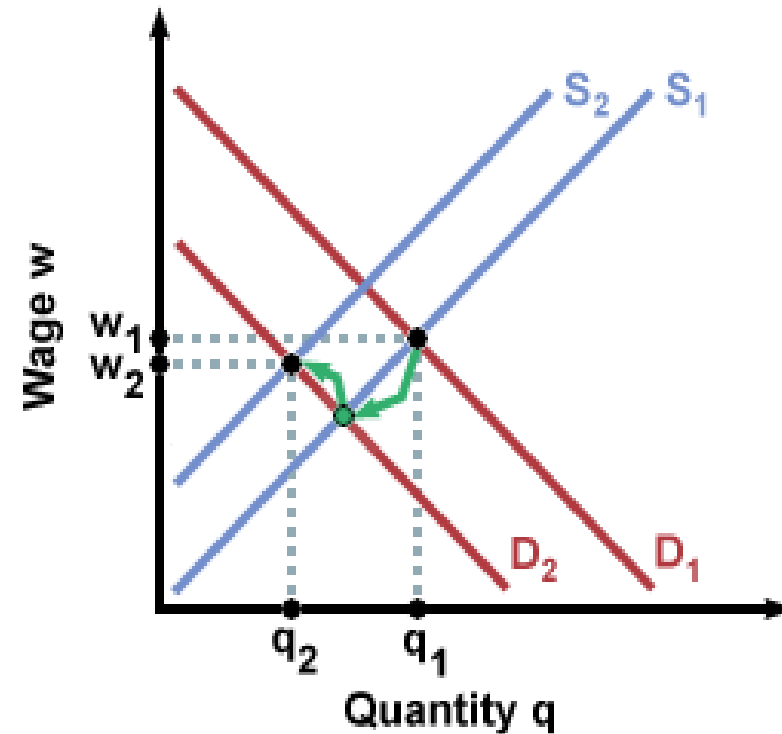
Changes in population shares	3.1 pp decline
Employment declines among those age 16-54	3.7 pp decline
Employment increases among those age 55 plus	1.3 pp increase
<u>Interaction terms</u>	<u>0.9 pp increase</u>
Total	4.5 pp decline

(A Simple) Decomposition by Sex/Age/Education: Results

Changes in population shares	2.1 pp decline
Employment declines among those age 16-54	4.1 pp decline
16-24 year olds in school	1.0 pp decline
25-54 year olds with high school or some college	2.0 pp decline
Employment increases among those age 55 plus	0.7 pp increase
<u>Interaction terms</u>	<u>1.0 pp increase</u>
Total	4.5 pp decline

Potential causes of within-group E/POP declines

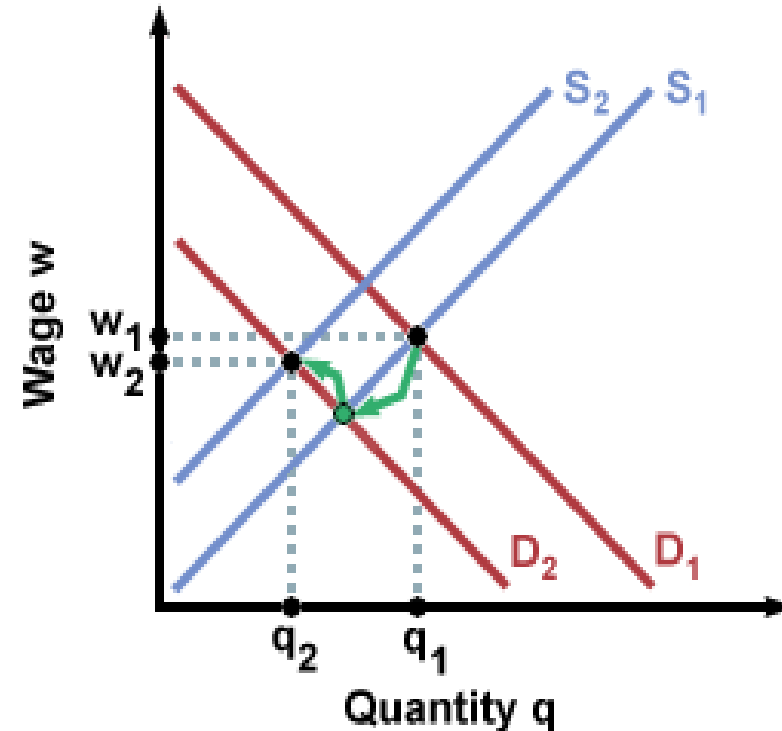
1. Shifts in labor demand
2. Shifts in labor supply
3. Institutional factors and labor market frictions



Potential causes of within-group E/POP declines

1. Shifts in labor demand:

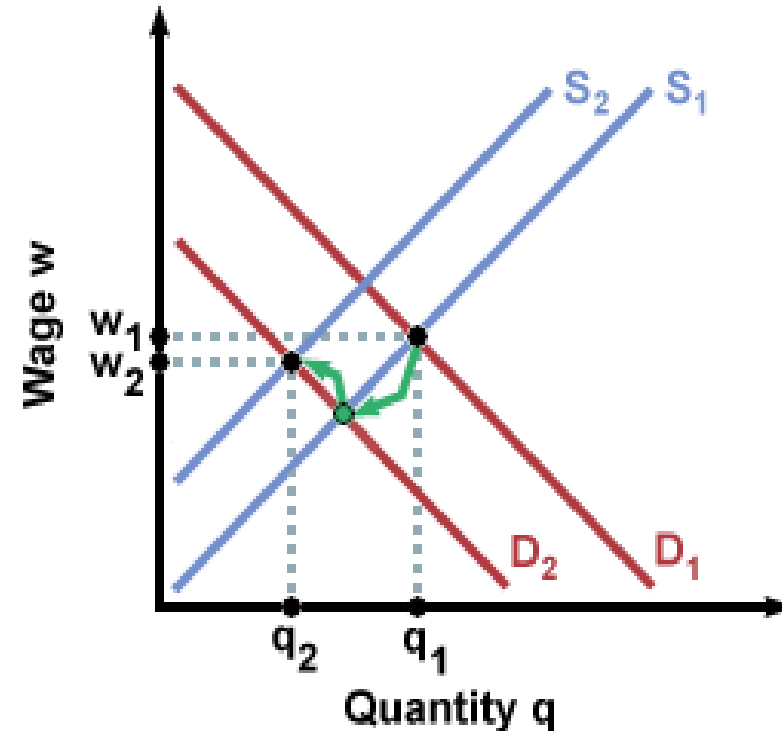
- Growth in imports from China
- Technology, including computerization and industrial robots



Potential causes of within-group E/POP declines

2. Shifts in labor supply:

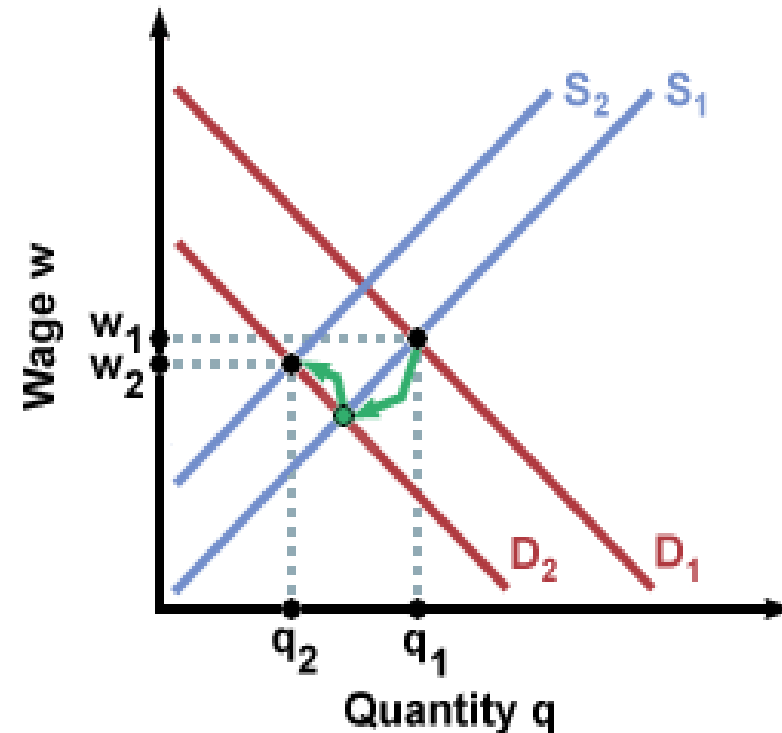
- Disability benefits: SSDI, SSI, VADC
- SNAP expansions
- Public health insurance expansions
- More generous EITC
- Increased rates of spousal employment
- (lack of) Family friendly policies: Child care, paid family leave
- Changes in leisure options/social norms
- Opioid addiction
- Immigration



Potential causes of within-group E/POP declines

3. Institutional factors and labor market frictions

- Higher minimum wages
- Increased rate of incarceration
- Rise in occupational licensing
- Increases in skill mismatch
- Increases in geographic mismatch/declining mobility



Approach to quantifying effects

- Critically assess literature that attempts to estimate causal relationship between factor and employment
 - Select parameter estimate
- Obtain data on how factor changed over 1999 to 2016 period
- Apply (imperfect) causal estimate from literature to (imperfect) data on changes in factor => rough estimate of how many people not working in 2016 because of change in factor

Drawing conclusions from the exercise

- Limited to quantifying the effects of factors for which the literature provides credible estimates
- Most estimates are partial equilibrium, meaning forced to extrapolate from micro to macro
- Context surely matters
 - Effects of labor demand shocks will depend on other opportunities available to affected workers
 - Effects of access to disability insurance likely to be larger in the presence of adverse demand shocks
 - And so on...
- Nonetheless helpful to lay out which factors the evidence suggests have been important, which the evidence suggests could *not* have been important and which there is just not enough evidence to say

Summarizing the available evidence (1 of 3)

<i>Factors</i>	Estimated reduction in E/POP (pp.)
<u><i>Major contributing factors</i></u>	
<i>Growth in imports from China</i>	1.04
<i>Adoption of industrial robots</i>	0.37
<u><i>Significant contributing factors</i></u>	
<i>Increased receipt of disability benefits (SSDI, VDC)</i>	(0.14+0.06=) 0.20
<i>Higher minimum wages</i>	0.10
<i>Increased rate of incarceration</i>	0.13
	1.84

Summarizing the available evidence (2 of 3)

<i>Factors</i>	Estimated reduction in E/POP (pp.)
<u><i>Insignificant factors</i></u>	
<i>SNAP expansions</i>	~0
<i>Public health insurance expansions</i>	~0
<i>More generous EITC</i>	~0
<i>Increased rates of spousal employment</i>	~0
<i>Increased difficulties due to lack of family leave</i>	~0
<i>Immigration</i>	~0

Summarizing the available evidence (3 of 3)

Estimated reduction
in E/POP (pp.)

Factors

Indeterminate given state of evidence

Increased difficulties due to lack of child care

unclear

Rise in occupational licensing

unclear

Increases in skill mismatch

unclear

Increases in geographic mismatch/declining mobility

unclear

Changes in leisure options/social norms

unclear

Opioid addiction

unclear

Growth in imports from China

Background

- From 1999 to 2011 Chinese imports valued in 2007 US dollars increased by 270%; over this period, employment in US manufacturing fell from 17.3M to 12.3M.

Considerable evidence links manufacturing employment declines to China imports:

Autor, Dorn, and Hanson (2013), 1999-2007, exploit local labor market variation in predicted import competition based on initial industry composition;

Bernard, Jensen, and Schott (2006), 1977-1997, find employment declines due to increased imports from low-income countries;

Autor, Dorn, Hanson, and Song (2014), use individual data, show reduced employment and earnings, increased DI receipt;

Pierce and Schott (2016) look at 2001 China accession to WTO, find larger employment declines in industries more exposed to tariff policy change.

Key citation for magnitude: Acemoglu, Autor, Dorn, Hanson and Price (2016)

Growth in imports from China

Key citation for magnitude: Acemoglu, Autor, Dorn, Hanson and Price (2016)

- Consider industry level exposure to Chinese imports in local markets; variation across commuting zones (CZs) in industry composition with predicted industry exposure to imports (IV: Industry imports from China in 8 other countries)
- Use input/output tables to adjust for upstream effects on manufacturing suppliers (negative in theory, and in data) and downstream effects on consumers (ambiguous in theory, absent in data)
- Incorporate general equilibrium effects: Reallocation effects (should offset in theory, but find no effect of import competition on non-exposed industries in CZ) and aggregate demand effects (should amplify in theory, and see that in data)

Key estimate: Growth in Chinese imports from 1999 to 2011 reduced employment by 2.37 million

Growth in imports from China: Estimated E/POP decline

- Acemoglu et al. (2016): From 1999 to 2011 Chinese imports valued in 2007 US dollars increased by 270%; associated with decline of 2.37 million workers

Our extrapolation:

- From 1999 to 2016, value of Chinese imports increased by 302%
- Approximation: $1.12 * 2.37 = 2.65$ million workers
- Adding those workers to 2016 workforce would raise E/POP by 1.04 pp

But what about the positive effects of trade?

- Not suggesting no important benefits from trade, only that there are losers as well as winners in an increasingly open global economy
- Difficult to quantify export-related job gains and no reason to believe that they have offset import-related job losses one for one
- Clear evidence that increased import competition has had long-term effects on employment of workers in affected areas
 - Consistent with evidence of persistent local effects for other types of labor demand shocks (e.g. Acemoglu and Restrepo (2017) on the introduction of industrial robots, Charles, Hurst and Schwartz (2018) on the decline in manufacturing, Yagan (2018) on the Great Recession)
 - Geographic mobility has fallen (Molloy et al 2016) and, over period considered, negative local demand shocks have not caused increased outmigration from affected areas

Adoption of industrial robots

“automatically controlled, reprogrammable, and multipurpose”

- Stock of robots in US and Western Europe increased fourfold between 1993 and 2007
- One new robot per 1000 US workers
- Available evidence suggests notable effects of industrial robots on manufacturing employment; in contrast, little dis-employment due to computerization (albeit wage effects)
- *Key estimate: Acemoglu and Restrepo (2017)*
Structurally adjusting for trade (assumption based): 0.34 pp reduction (5.6 workers per robot)

Our extrapolation:

- From IFR data, estimate that 170,516 more robots installed in the United States as of 2016 than in 1999; apply AR (2017) estimate of 5.6 workers displaced per robot => 0.955M workers
- Adding these workers to 2016 workforce would raise E/POP by 0.37 pp.

Increased receipt of SSDI

- Share of population on SSDI rose 1999-2016 for every five-year age category from 30-34 through 55-59.
- Many well-identified papers find negative employment effects

Key estimate: Maestes, Mullen, and Strand (2013)

Benefit receipt lowers participation rate for marginal SSDI recipients (~23% of applicants) by 28 pp on average; effect ranges from 10 pp for those aged 60-64 to 37 pp for those aged 30-39

Our extrapolation:

- SSA data: SSDI caseload grew by 3.93M recipients between 1999 and 2016, from 4.88M to 8.81M; almost all growth occurred at age 45 and above
- Estimate excess SSDI caseload in 2016 within each five-year age bin, by comparing *actual* caseload to *projected* caseload with actual population changes but share of age group receiving benefits at 1999 level.
- Summing over age groups => 1.64M more people on SSDI at end of 2016 than would have occurred just from population growth and aging (19% of 2016 caseload).
- Apply age-group specific employment elasticities from MMS (2013) to excess caseload by age group => 360,869 additional workers.
- Adding these workers to 2016 workforce would raise E/POP by 0.14 pp.

Increased receipt of Veterans Disability Compensation

- Veterans Disability Compensation (VDC) pays benefits to individuals with medical conditions resulting from military service; amount based on a determination of the severity of the impairment.
- Since 2001, VDC program has grown rapidly, due in part to liberalization of medical criteria. From 2000 to 2013, after having been stable for decades, share of veterans receiving VDC increased from 9% to 18%.

Key estimate: Autor, Duggan, Greenberg and Lyle (2016)

Estimate that expanded access to benefits from a policy change reduced eligible veterans' participation by 18 pp

Our (very rough) extrapolation:

- VA reports 4.36M VDC benefit recipients in 2016, compared to 2.3M in 1999.
- Estimate excess VDC caseload in 2016 as actual growth minus growth holding reciprocity rates within broad age groups constant; apply Autor et al (2016) estimate of 18 pp reduction to excess VDC caseload age 35-54; assume half that for younger and older => rough estimate of 145,990 fewer workers over this period.
- Adding these workers to 2016 workforce would raise E/POP by 0.06 pp

Higher minimum wages

- In 2016, 29 states plus DC minimum wage > federal minimum, vs. 8 states plus DC in 1998.
- Literature on employment effects of minimum wages extremely contentious
- *Key estimates:* Dube, Lester and Reich (2010), Allegretto, Dube and Reich (2011), Allegretto, Dube, Reich and Zipperer (2013), Dube and Zipperer (2015): Zero effect on employment; Neumark, Salas and Wascher (2013): 0.3 employment elasticity for teenagers, Powell (2016) 0.44 employment elasticity for teenagers

Our extrapolation:

- Give 2/3 weight to estimate of zero employment effect from multiple studies and 1/3 weight to Powell (2016); assume elasticity for affected adults 1/3 that for teenagers (assumption borrowed from CBO)
 - DOL data on statutory minimums: Effective real minimum wage rose 9.0% 1998 to 2016.
- => Rough estimate that these minimum wage increases reduced E/POP by about 0.10 pp.

Increased rate of incarceration

- Dramatic growth: In 1980, 220 per 100,000 incarcerated; by 2012, 710 per 100,000 incarcerated.
- Attributable mostly to policy changes, i.e., mandatory sentencing
- (Note: Adding incarcerated to E/POP denominator would make decline even larger.)
- Incarceration not only takes individuals out of work force, but potentially harms post-release employment prospects.

Key estimates: Mueller-Smith (2015). Effect identified using random assignment of criminal defendants in Harris County, TX to courtrooms with different judges and prosecutors

- Significant prior earnings, 2-plus-year prison term: 39 pp reduction in p(employment)
- Significant prior earnings, 1-year prison term: 24 pp reduction
- Low prior earnings, 2-plus-year prison term : 11 pp reduction
- Low prior earnings, 1-year prison term: 9 pp reduction

Increased rate of incarceration: Estimated E/POP decline

Our (very uncertain) extrapolation:

- Limitation: No public dataset tracks formerly incarcerated
- Bucknor and Barber (2016) estimate number of adults with prior prison time using BJS data on number of people of each age released each year 1968 thru 2014; adjust for recidivism and mortality.
 - Estimate 6.1-6.9M former prisoners age 18-64 as of 2014
 - We use midpoint of 6.5M in our calculation
- Use 2014 data from NLSY97 (sample age 30-34) to gauge time served
 - Suggests ~7% of this age group had been in prison; 43% for 2+ years, 27% for 1-2 years.
- Based loosely on observed trends, we assume 60% of those formerly incarcerated as of 2016 had served time in prison because of policy changes => 1.7M “excess” prisoners with 2+ year prison term; 1.0M with 1-2 year terms
- Further assume (based on Mueller-Smith sample) that 18% would have had significant earnings pre-prison and 58% would have had low earnings pre-prison
- Apply those estimates to estimated effects from Mueller Smith (4 groups) => loss of 324,000 workers.
- Adding these workers to 2016 workforce would raise E/POP by 0.13 pp.

Factors evidence suggests unlikely to be important

SNAP expansion

- Two studies find small negative effects on employment for very specific groups; program includes stringent work requirements for adults without children
- Caseloads increased during recession, so can't explain pre-recession EPOP declines

Public health insurance expansion

- Evidence on employment effects mixed, but most studies find they are small
- ACA expanded Medicaid coverage and provided insurance subsidies, but not passed until 2010, so can't explain EPOP declines over most of period

More generous EITC

- If anything, changes to EITC during period should have made it more attractive for second earners in married couple households to work

Factors evidence suggests unlikely to be important (contd)

Increased rates of spousal employment

- Non-employed men slightly less likely to have a working spouse in 2015 than in the late 1990s

Increase difficulties due to lack of family leave

- Access to paid family leave may have small positive effects on employment, but modest changes over period have been in the direction of increasing access

Immigration

- Weight of evidence suggests no significant effects of immigration on employment rates

Often asserted, but more research needed

Child care

- Evidence shows female employment responsive to price of child care, but do not know to what extent it has in fact become more difficult to access high quality, affordable child care

Occupational licensing

- Plausible that growth in occupational licensing (~5% in 1950s, ~30% today) dampened growth in employment over this period, but no compelling evidence (yet)

Skill mismatch

- CEOs often complain that workforce lacks needed skills, but lack data to establish severity of problem

Geographic mismatch and worker mobility

- Mobility clearly has fallen and may have exacerbated problems caused by other forces, but would like a clearer understanding

Provocative ideas, evidence not yet clear

Improved video game technology versus changing social norms

- Improved video game technology (Aguiar, Bilal, Charles, and Hurst, 2017), young men spending more time gaming
- Young out-of-work men living with relatives
- But, hard to separate from cohort changes in norms –*how to document?*

Role of opioid addiction/prescriptions

- Krueger (2017) shows increased rates of reported pain among those out of workforce; assuming increased opioid use is cause not effect of declining employment, can explain upper bound of 20% of decline in LFPR
- Currie, Jin and Schnell (2018) find increased prescription rates result in increased female employment; no decline in male employment.

Summary

- Within-group declines in employment among those age 16-54 have had a larger effect on overall E/POP than aging of the population from 1999-2016
- Major factors: Imports from China and adoption of robots
- Less important factors: Disability insurance, veterans disability compensation, higher minimum wages and increasing incarceration
- Not significant as drivers of decline: Expanded safety net programs (other than disability insurance); immigration
- Need more evidence: Occupational licensing; child care access and affordability; skill mismatch; geographic mismatch and worker mobility; changing social norms; and opioid addiction