Gender Wage Gap Decomposition and Discrimination

Economics and Gender

LECTURE 3

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Gender wage gap - causes

What drives the gender wage gap?

- Make a list of 5 most likely reasons why women earn less than men

- Discuss these reasons in groups of 3, come up with a group list

- Present the list to the rest of a class

- Can we somehow estimate which of these has the greatest impact on wage gap? What is the main culprit?

Causes of the gender wage gap

- Difference in characteristics of individuals:
    - Education attainment, field of study
    - Labour market experience
- Differences in jobs:
    - Horizontal segregation - type of occupation
    - Vertical segregation – position
    - Employer characteristics
    - Hours worked

Gender wage gap – regression approach

- Last lecture, we discussed how the gender wage gap can be estimated in a regression framework:

$$lnW_i = β_0 + β_1F_i + β_2X_i + ε_i$$

  - lnW_i = logarithm of wage of person i

  - $β_0$ = constant

  - F_i = variable indicating that person i is female

  - X_i = vector containing various characteristics of individual I (mainly socio-demographic and occupational characteristics)

- Which coeffient estimates the gender wage gap? How do we interpret it?

  - $β_1$ captures the wage differences between men and women that are not captured by individual characteristics X

Wage gap decomposition

Wage gap decomposition

- Blinder (1973) and Oaxaca (1973):
- Decompose the average wage gap into
  - the explained part (caused by observable characteristics of individuals)
  - and unexplained part (caused by ?)

Wage gap decomposition: Procedure

- Run wage regression for men and women separately:
  1. *Female wage regression:* $lnW_f = \beta_f X_f + \varepsilon_f$
  2. *Male wage regression:* $lnW_m = \beta_m X_m + \varepsilon_m$
  - Beta coefficients capture the gender specific returns to characteristics!
  - How much does an extra year of education increase my wage when I am a man/a woman?

- Write the average male and female wages as the ratio of beta coefficients and average female/male characteristics:
  1. *Female average wage:* $\overline{lnW}_f = \widehat{\beta}_f \bar{X}_f$
  2. *Male average wage:* $\overline{lnW}_m = \widehat{\beta}_m \bar{X}_m$

Wage gap decomposition: Procedure

- Create a "counterfactual" average female wage, which would women received if they had male returns on characteristics
  - If an extra year of education increased the female wage by as much as it increases the male wage
  - Counterfactual female average wage: $\widehat{\beta_m} \, \bar{X}_f$
- Use this to decompose the gender wage gap:
  - $\overline{lnW_m} - \overline{lnW_f} = \widehat{\beta_m}\bar{X}_m - \widehat{\beta_f}\,\bar{X}_f - \widehat{\beta_m}\,\bar{X}_f + \widehat{\beta_m}\,\bar{X}_f =$

    $\widehat{\beta_m}(\bar{X}_m - \bar{X}_f) + (\widehat{\beta_m} - \widehat{\beta_f})\,\bar{X}_f$
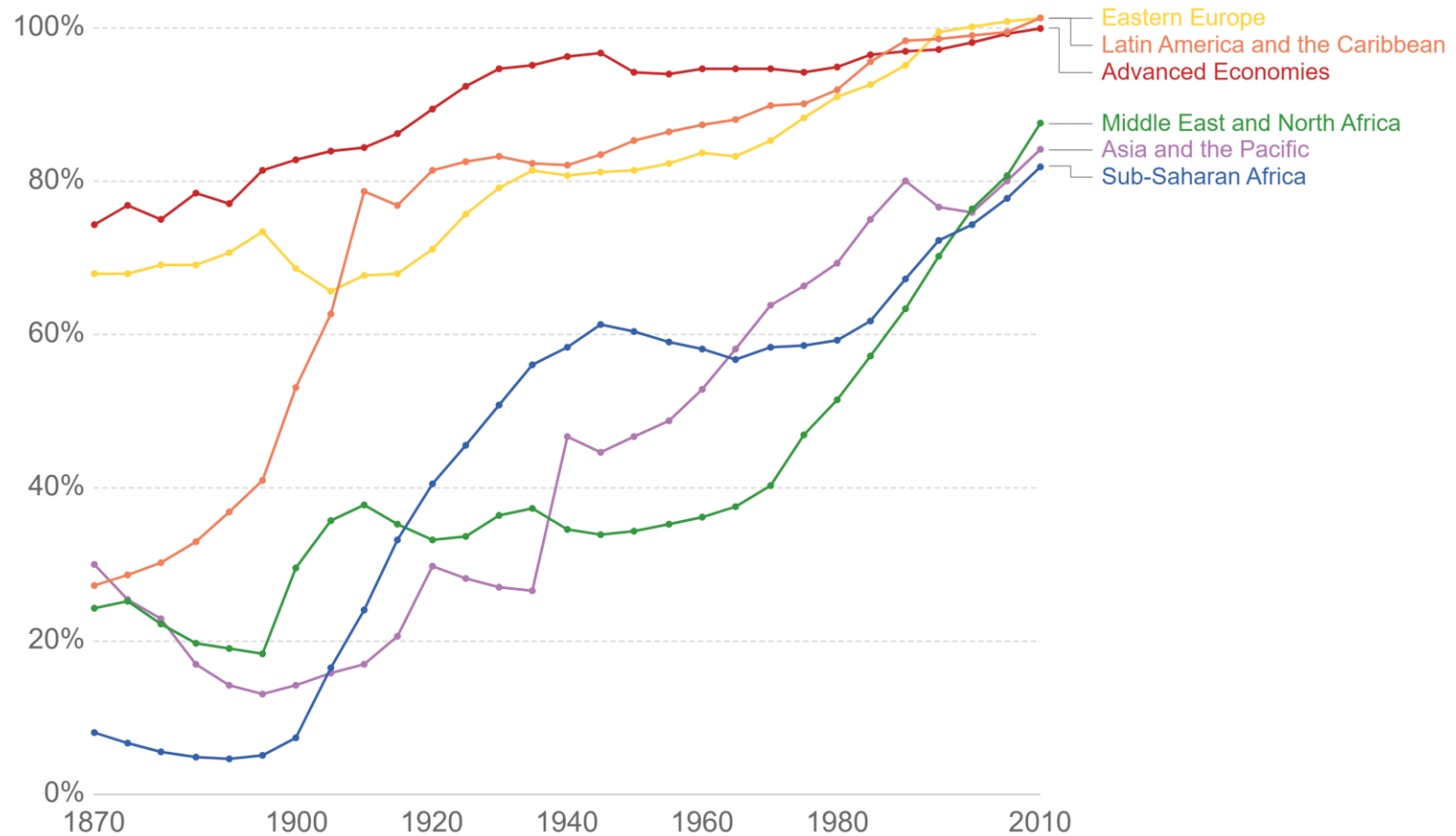
Wage gap decomposition: Interpretation

- What is the interpretation of this decomposition?
  - The first part capture the differences in characteristics of men and women and how these contribute to the wage gap
  - The second part capture differences in returns to these characteristics
- Alternatively, you could use "counterfactual" male wage, which would men earn at female returns or you can use the average returns of all workers to construct the coutnerfactual

Stylized facts about causes of the wage gap

Is it education gap that drives the gender wage gap?

Gender ratios for mean years of schooling
Female-to-male ratio of average years of schooling, expressed in percents. All education levels for population aged 15-64. Regional estimates are population-weighted averages.

Eastern Europe
Latin America and the Caribbean
Advanced Economies

Middle East and North Africa
Asia and the Pacific
Sub-Saharan Africa

Source: Lee and Lee (2016)

OurWorldInData.org/global-rise-of-education • CC BY-SA

Is it education gap that drives the gender wage gap?

- Not any more (at least not in developer countries)
- Huge narrowing of the educational gap all over the world
- Women have about the same highest level (in some countries even higher!) of education attained as men

Unadjusted vs adjusted wage gaps

- Unadjusted wage gap – the difference between wages of all male and female workers
- Adjusted wage gap – the difference between wages of male and female workers who are similar in some (all) characteristics
  - Wage gap adjusted for education is a difference between wages of men and women with the same level of education

Unadusted and adjusted wage gaps
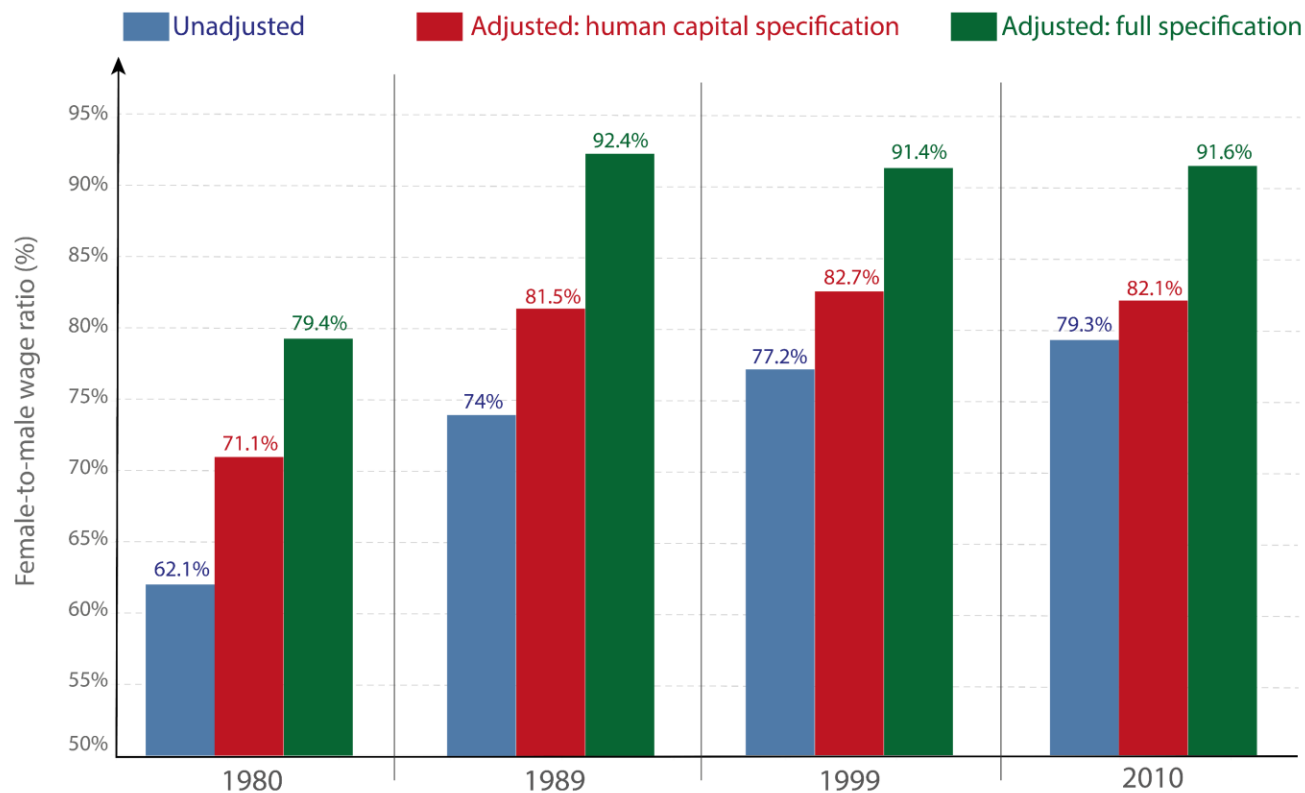

Female-to-male wage ratio in the US

Shown is the evolution of the female to male wage ratios from the years 1980 to 2010 under three scenarios:
(i) Unadjusted for co-variates (blue);
(ii) Adjusted, controlling for gender differences in human capital, i.e. education and experience (red);
(iii) Adjusted, controlling for a full range of covariates, including human capital, occupation, region, race etc. (green).
The difference between 100% and the full specification (shown in green) is the "unexplained" residual.

Our World in Data

- Unadjusted
- Adjusted: human capital specification
- Adjusted: full specification

Female-to-male wage ratio (%)

Year	Unadjusted	Human capital	Full specification
1980	62.1%	71.1%	79.4%
1989	74%	81.5%	92.4%
1999	77.2%	82.7%	91.4%
2010	79.3%	82.1%	91.6%

Data source: Blau and Kahn (2017). The Gender Wage Gap: Extent, Trends, and Explanations.
The data visualization is available at OurWorldinData.org. There you find research and more visualizations on this topic.

Licensed under CC-BY-SA by the authors Esteban Ortiz-Ospina and Max Roser.
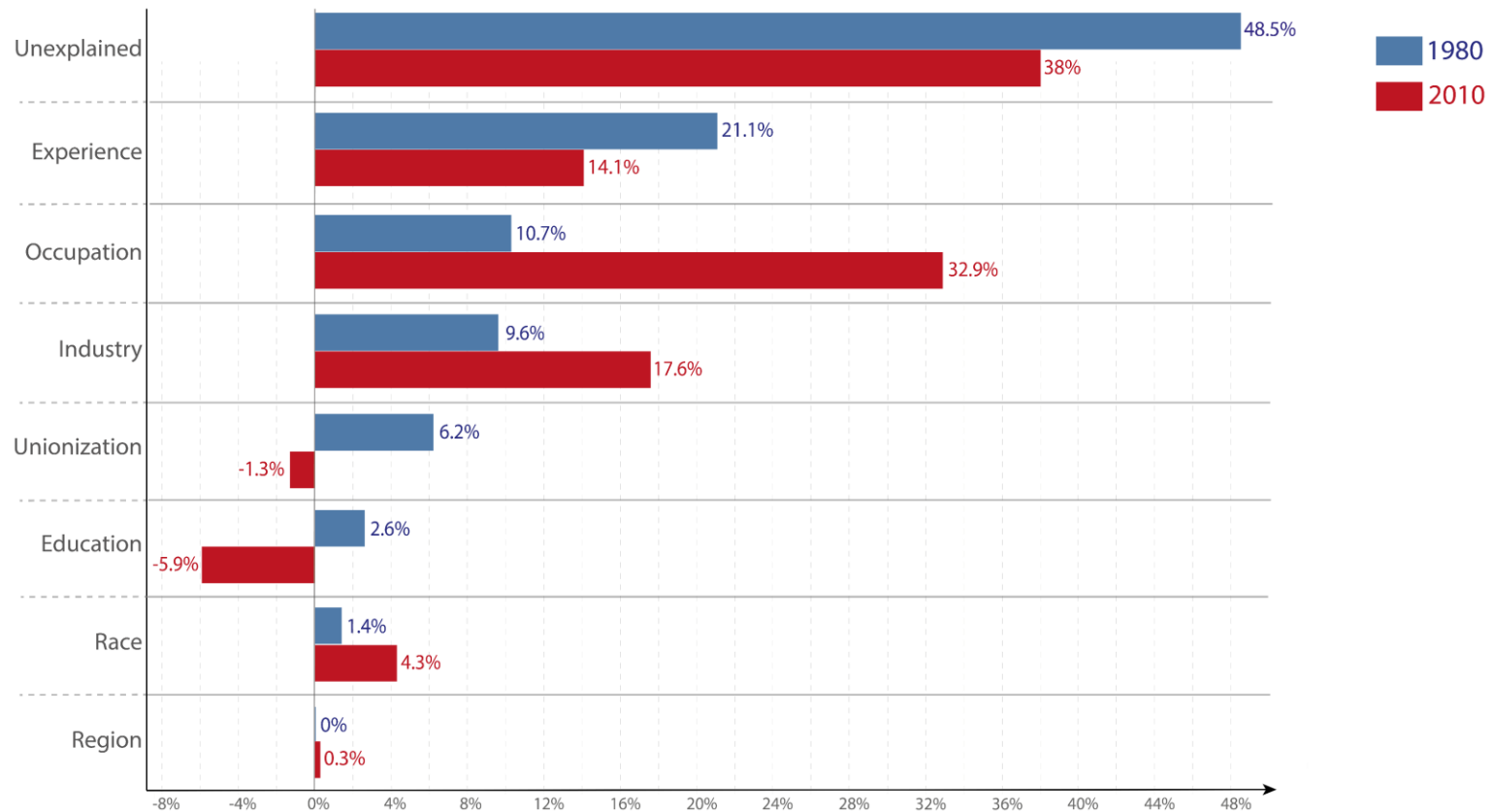
Lessons from Blau and Kahn (2017):

- The unadjusted gender pay gap in the US shrunk over the period.

- The adjusted gender pay gap has shrunk.
  - If we focus on groups of workers with roughly similar jobs, tenure and education, we also see a narrowing.

- Education and experience used to help explain a very large part of the pay gap in 1980, but is not very important nowadays.

- Most of the convergence in earnings occurred during the 1980s, a decade in which the unexplained gap shrunk substantially.

What drives the wage gap if not education?

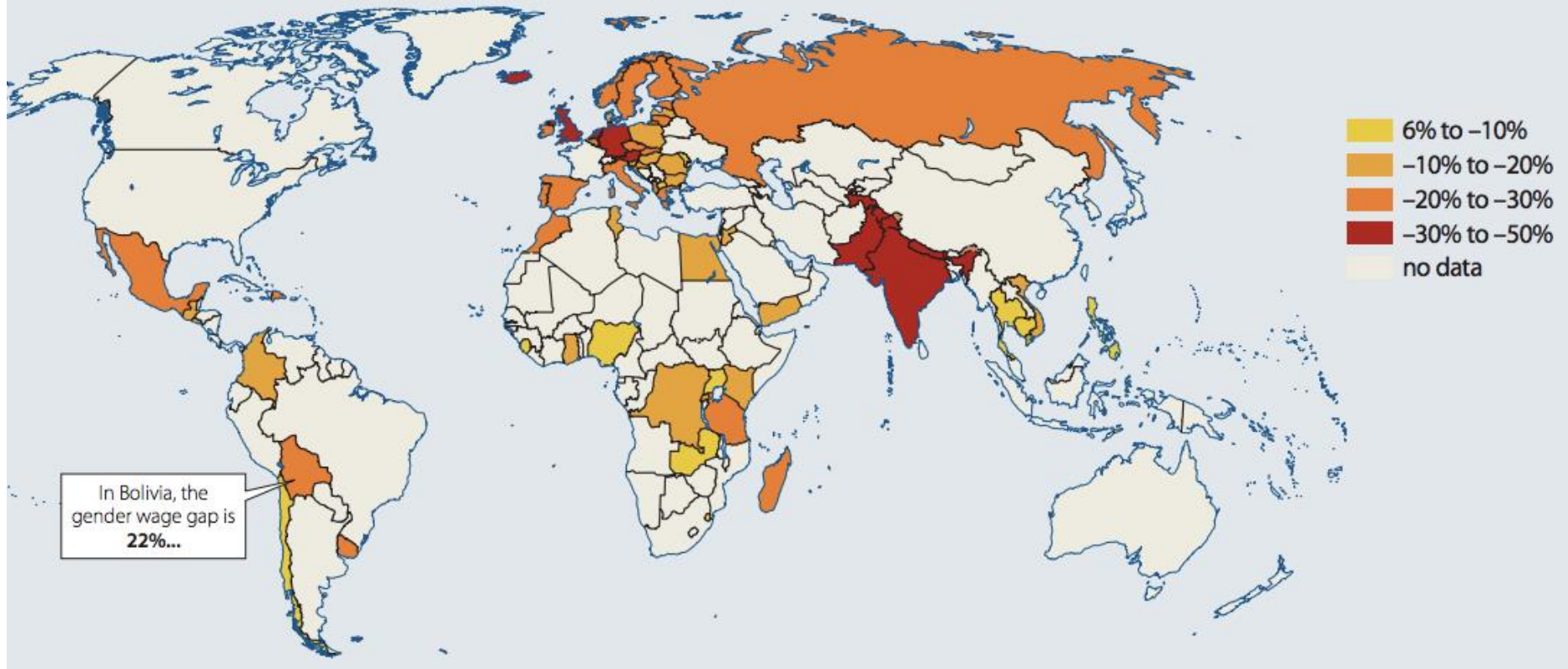## Decomposition of the gender wage gap in the US

Shown are the fractions of the total gender wage gap accounted for by different labor-market variables in 1980 (shown in blue), and 2010 (red). "Occupation" for example, refers to gender differences in occupation (i.e. lawyer vs. teacher). The "unexplained" percentage refers to the residual that remains after all other factors are accounted for – it is often seen as discrimination.

Category	1980	2010
Unexplained	48.5%	38%
Experience	21.1%	14.1%
Occupation	10.7%	32.9%
Industry	9.6%	17.6%
Unionization	6.2%	-1.3%
Education	2.6%	-5.9%
Race	1.4%	4.3%
Region	0%	0.3%

Data source: Blau and Kahn (2017). The Gender Wage Gap: Extent, Trends, and Explanations.
The data visualization is available at OurWorldinData.org. There you find research and more visualizations on this topic.

Licensed under CC-BY-SA by the authors Esteban Ortiz-Ospina and Max Roser.
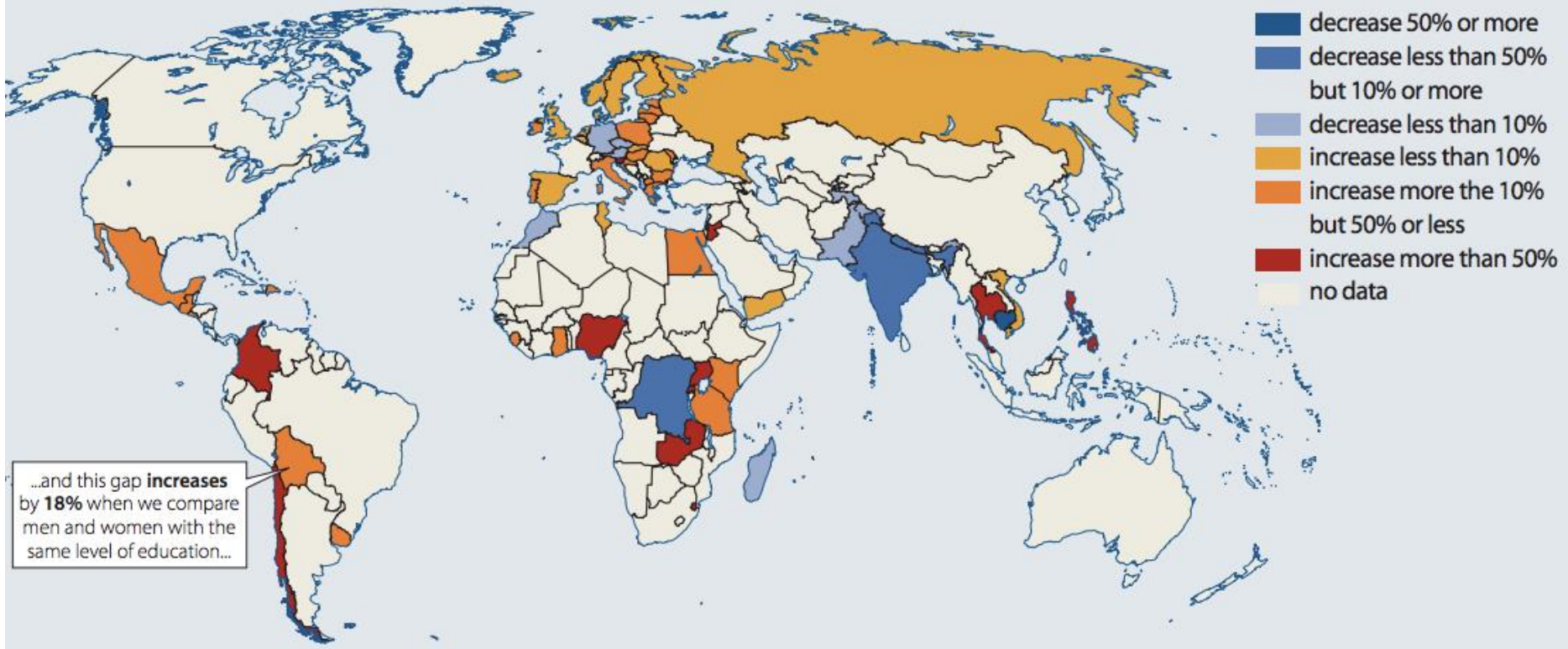
Lessons from Blau and Kahn (2017):

- Education and experience have become much less important in explaining gender differences in wages over time

- Occupation and industry have become more important in explaining these differences over time!

- This is also true in other countries around the world: Today **gender pay differences are much better explained by occupation than by education**
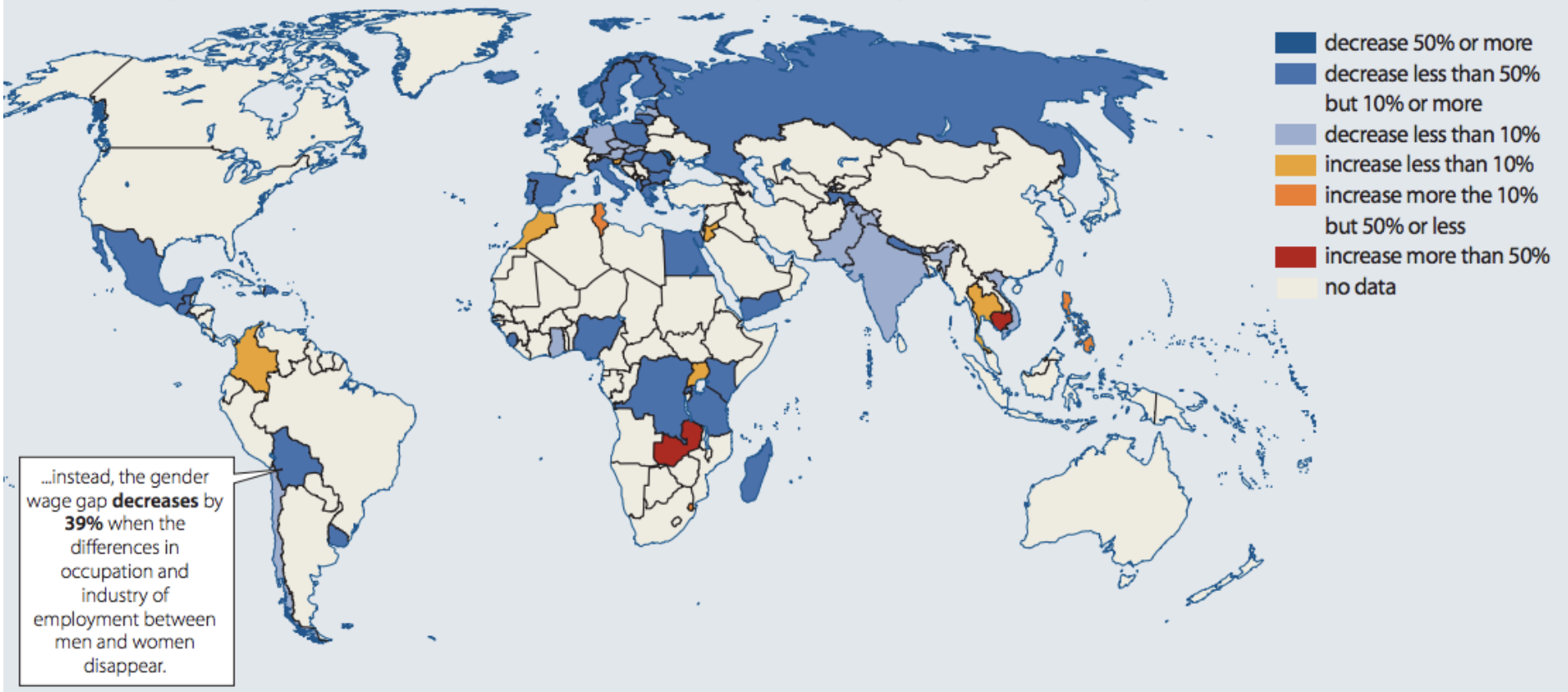
a. Women earn lower wages than men the world over

Legend:
- 6% to −10%
- −10% to −20%
- −20% to −30%
- −30% to −50%
- no data

In Bolivia, the gender wage gap is **22%**...

Source: World Development Report (2012) Gender Equality and Development, World Bank.
Available online from https://siteresources.worldbank.org

b. Education cannot explain these differences...

Legend:
- decrease 50% or more
- decrease less than 50% but 10% or more
- decrease less than 10%
- increase less than 10%
- increase more the 10% but 50% or less
- increase more than 50%
- no data

...and this gap **increases** by **18%** when we compare men and women with the same level of education...

Source: World Development Report (2012) Gender Equality and Development, World Bank.
Available online from https://siteresources.worldbank.org

c. . . . but gender differences in occupation and industry of employment can, to a large extent

Legend:
- decrease 50% or more
- decrease less than 50% but 10% or more
- decrease less than 10%
- increase less than 10%
- increase more the 10% but 50% or less
- increase more than 50%
- no data

...instead, the gender wage gap **decreases** by **39%** when the differences in occupation and industry of employment between men and women disappear.

Source: World Development Report (2012) Gender Equality and Development, World Bank.
Available online from https://siteresources.worldbank.org

Wage gaps and horizontal segregation

NURSES

Salary = $40,000

Given same level of education, experience, and work

MECHANICAL ENGINEERS

Salary = $60,000

Given same level of education, experience, and work
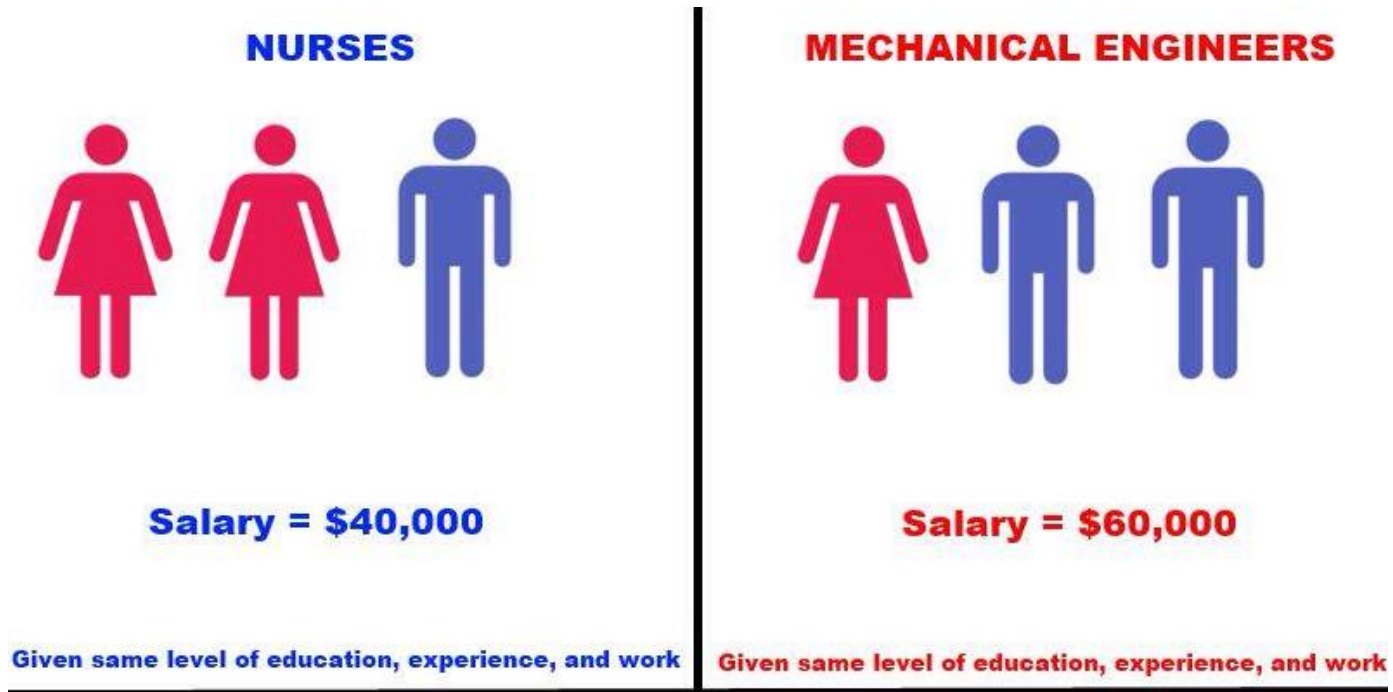
Women's Average Pay = (40,000 + 40,000 + 60,000) / 3 = $46,666.67

Men's Average Pay = (40,000 + 60,000 + 60,000) / 3 = $53,333.33

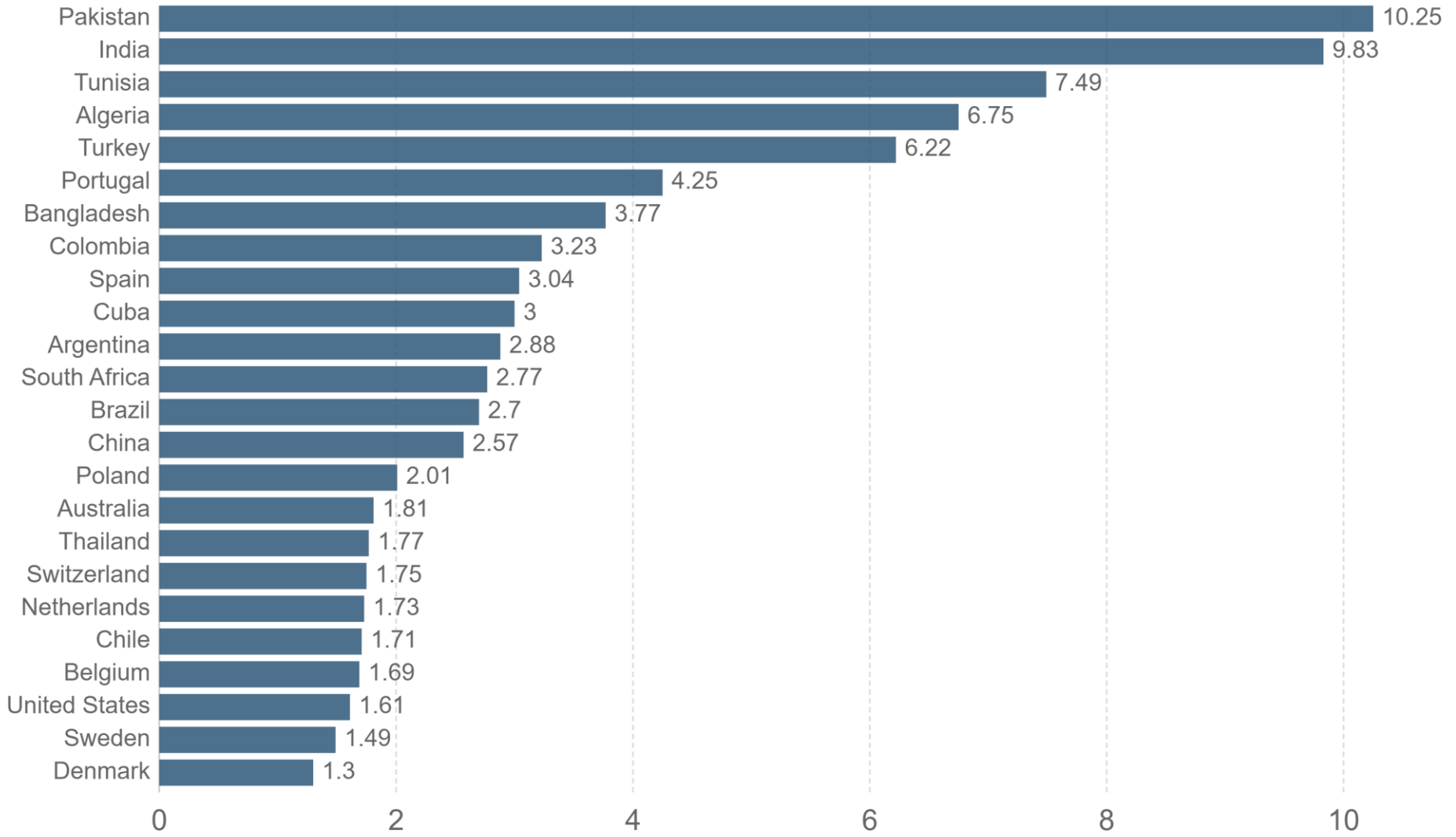Phantom Wage Gap = $46,666.67 / $53,333.33 = $0.875 on the $1

Gender wage gaps and motherhood

Why women choose different occupations than men?

- Women are the primary carers in most households, doing most of the housework and childcare
- Therefore, women (especially married and those with children) look for occupations that enable them to reconcile work and family
  - Occupations with lower pay, but more flexibility, usually also shorter hours
- This drives the gender wage gap and also explains why the gender wage gap is almost non-existent for single childless and young individuals

Female-to-male ratio of time devoted to unpaid care work, 2014

Female to male ratio of time devoted to unpaid care work. Unpaid care work refers to all unpaid services provided within a household for its members, including care of persons, housework and voluntary community work.

Country	Value
Pakistan	10.25
India	9.83
Tunisia	7.49
Algeria	6.75
Turkey	6.22
Portugal	4.25
Bangladesh	3.77
Colombia	3.23
Spain	3.04
Cuba	3
Argentina	2.88
South Africa	2.77
Brazil	2.7
China	2.57
Poland	2.01
Australia	1.81
Thailand	1.77
Switzerland	1.75
Netherlands	1.73
Chile	1.71
Belgium	1.69
United States	1.61
Sweden	1.49
Denmark	1.3

Source: OECD Gender, Institutions and Development Database (2014)   OurWorldInData.org/women-in-the-labor-force-determinants/ • CC BY-SA

Motherhood penalty

- The impact of motherhood on womens' earnings
- Motherhood usually causes a work interruption
- Lundborg, Plug and Rasmussen (2017) provide evidence on a large motherhood penalty from Denmark
  - Denmark is a country with a good availability of subsidized childcare and parental leave with job protection
  - Comparing women who had a successful *in vitro fertilization* treatment and those who had an unsuccessful one
  - "We explain the decline in hourly earnings, which is often referred to as the motherhood penalty, by women moving to lower-paid jobs that are closer to home.""
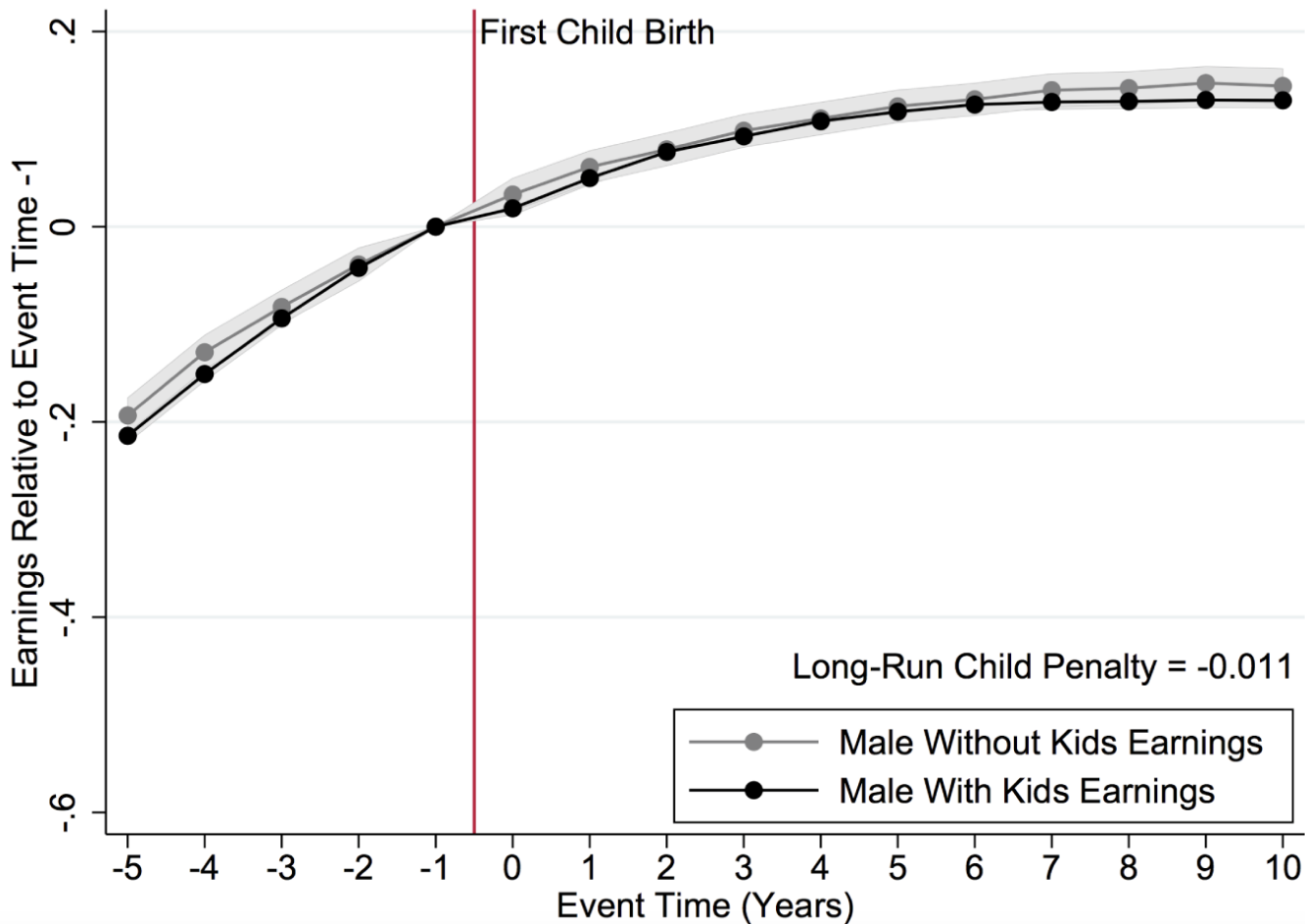
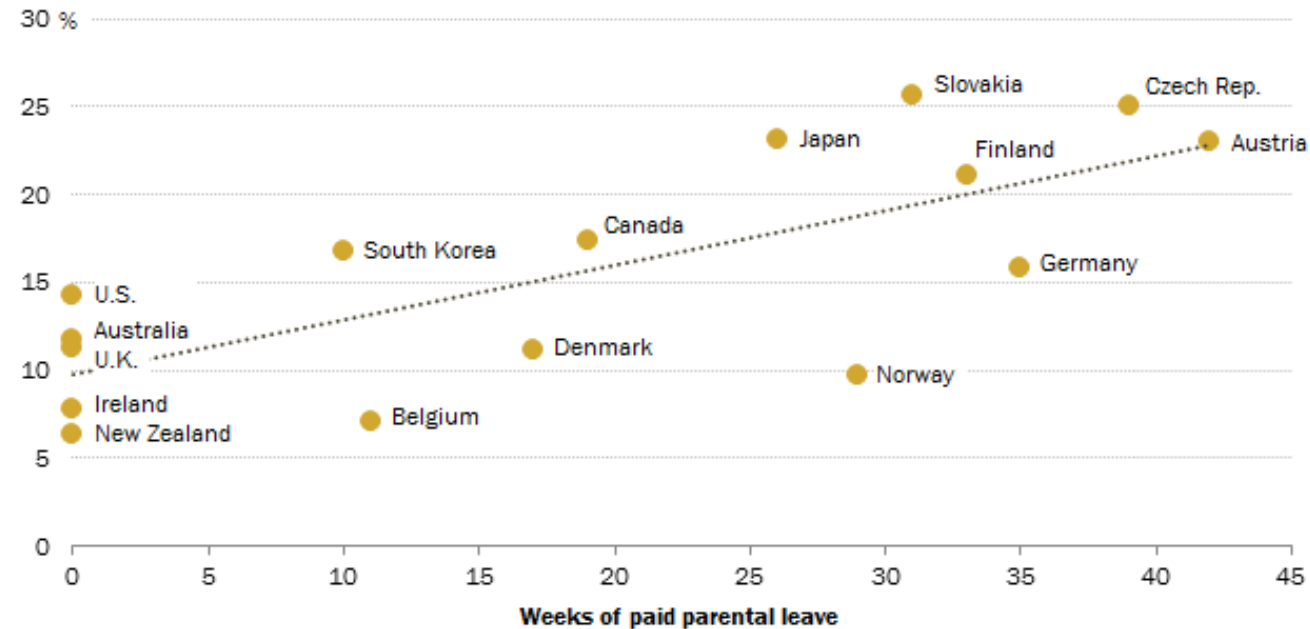# A: Women Who Have Children vs Women Who Don't
Earnings Impact
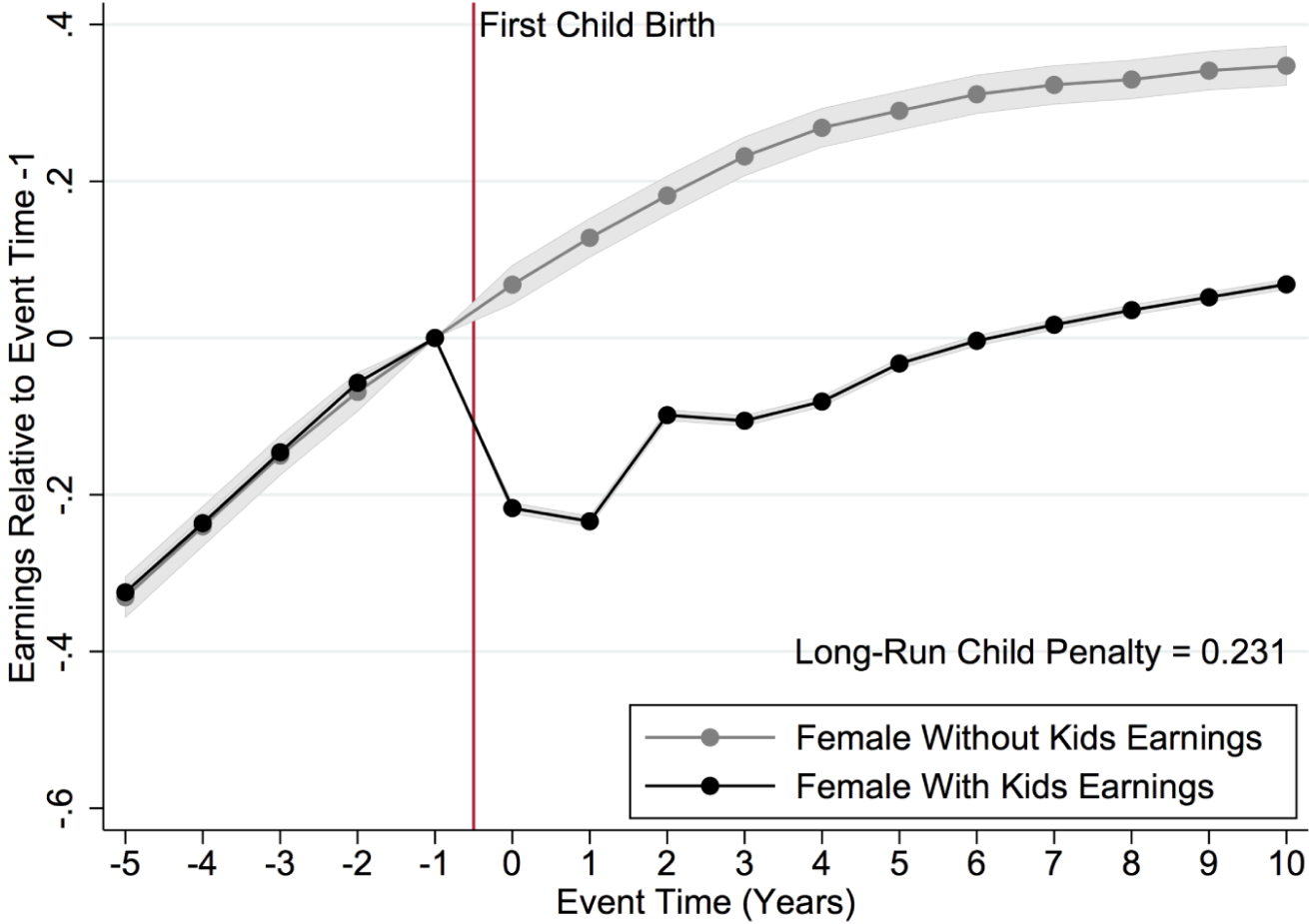
Source: Lundborg, P., Plug, E., & Rasmussen, A. W. (2017). Can Women Have Children and a Career? IV Evidence from IVF Treatments. American Economic Review, 107(6), 1611-1637

B: Men Who Have Children vs Men Who Don't
Earnings Impact

First Child Birth

Long-Run Child Penalty = -0.011

— Male Without Kids Earnings
— Male With Kids Earnings

Source: Lundborg, P., Plug, E., & Rasmussen, A. W. (2017). Can Women Have Children and a Career? IV Evidence from IVF Treatments. American Economic Review, 107(6), 1611-1637

More generous policies and not always a solution

More Paid Parental Leave Linked to Wider Gender Pay Gap

Full-time workers ages 30 to 34

Gender pay gap

Countries plotted: Slovakia, Czech Rep., Japan, Finland, Austria, Canada, South Korea, Germany, U.S., Australia, U.K., Denmark, Norway, Ireland, Belgium, New Zealand

X-axis: Weeks of paid parental leave (0 to 45)
Y-axis: Gender pay gap (0 to 30%)

*Gender pay gap is defined as the difference between male and female median earnings divided by male median earnings. Parental leave data is based on OECD estimates and reflects leave available to either parent, as opposed to maternity leave (only available to moms) or paternity leave (only available to dads). Due to ongoing changes in family leave policies, these estimates may not reflect present policies in all nations.

Source: OECD Family Database 2012; OECD Database on Earnings Distribution

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Policy recommendations

Goldin (2014): A Grand Gender Convergence: Its Last Chapter

- Goldin claims that if we want to achieve equality in the labor market, we need to introduce felxibility to occupations

- Women usually work shorter hours than men

- In some occupations, shorter hours are rewarded the same way as longer hours (same hourly wage), but in other occupations there is extra reward for long hours

  - Employee who is not around at certain times of the day (meetings) or who does not work full time (or more) has lower pay per hour

Goldin (2014): A Grand Gender Convergence: Its Last Chapter

- This non-linearity of earnings with respect to wages occurs in some occupations, but not in other
  - This is especially true in occupations where interaction with customers is important and there is more time pressure – especially in corporate, financial, and legal worlds.
  - In these occupations, flexibility comes at a high price
  - These occupations also have higher gender wage gap
- If we achieved the same hourly wage for people with different hours, gender wage gap would disappear

Goldin (2014): A Grand Gender Convergence: Its Last Chapter

- Policy recommendations:
  - Flexibility must be made less costly
  - Follow example of some sectors, where this is true even today, such as healthcare, real estate, banking, etc.
  - Change the structure of work in some occupations
  - Workers need to be subsitutes for each other (to not impose extra costs of non-present worker)
  - Clients must perceive workers as perfect substitutes (such as they do with pharmacists today)

What is behind the unexplained part of the gender wage gap?

- It includes all reasons that are not controlled for:
  - Discrimination
  - Unobserved worker characteristics
  - Unobserved differences in productivity
- We saw above that the unexplained part of the wage gap decreased over time
- Is this good news? Does it mean discrimination is less prevalent today than in the past?
- What about discrimination in occupational choice?

Summary

- Watch this video to get an overview about the causes of gender wage gaps and the policy recommendations for decreasing it

- https://wol.iza.org/videos/what-determines-the-gender-wage-gap

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