



# More than schooling: Returns to a broader set of skills in labor markets

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Increasingly globalized markets and profound technological and industrial shifts



Today's jobs will be obsolete over the coming decades

### Challenge for schools and universities

- ▶ Transmit new knowledge and build new skills
- ▶ But most of all, engender innovativeness, flexibility and adaptability among students

Otherwise, higher unemployment, slower growth and worse inequality

# Research questions

- ❖ Do schooling and different skills matter for earnings?
- ❖ Do they matter for men and women in the same way?
  - ▶ Do returns to schooling and skills differ for men and women?
  - ▶ Do they influence earnings, occupation and employment?
- ❖ Do they differ between men and women at different parts of the earnings distribution?
- ❖ Do they help to close the gender wage gap?

# What do we know about human capital in the labor market?

Relationships between schooling and noncognitive skills and noncognitive skills and labor market outcomes

- ▶ Small but growing literature in economics and psychology
- ▶ Still very small outside advanced countries

Despite narrowing education gender gap, there are persistent gender gaps around the world

- ▶ Explained by schooling and occupation and industry differences in many countries (Blau and Kahn 2017, World Development Report 2017)
- ▶ Is the remaining gap due to differences in cognitive and noncognitive skills? (Blau and Kahn 2017 explore for the U.S.)

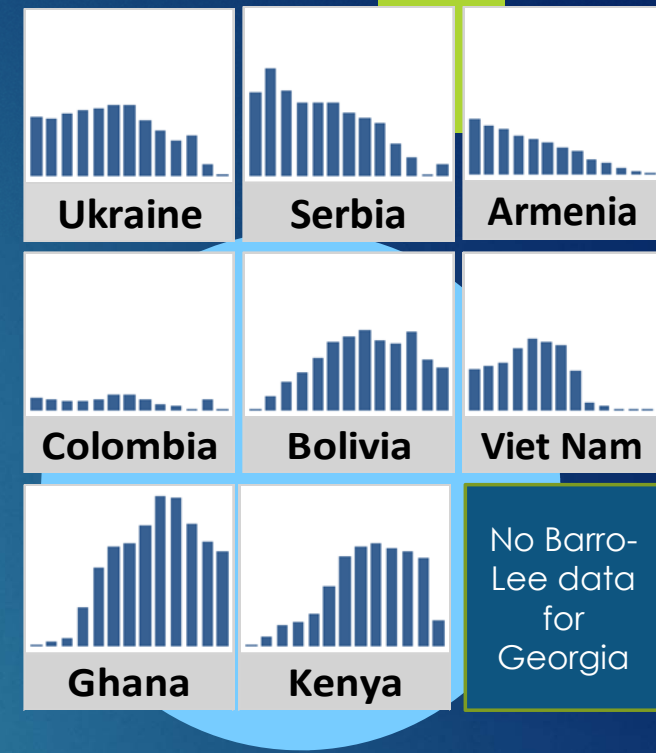
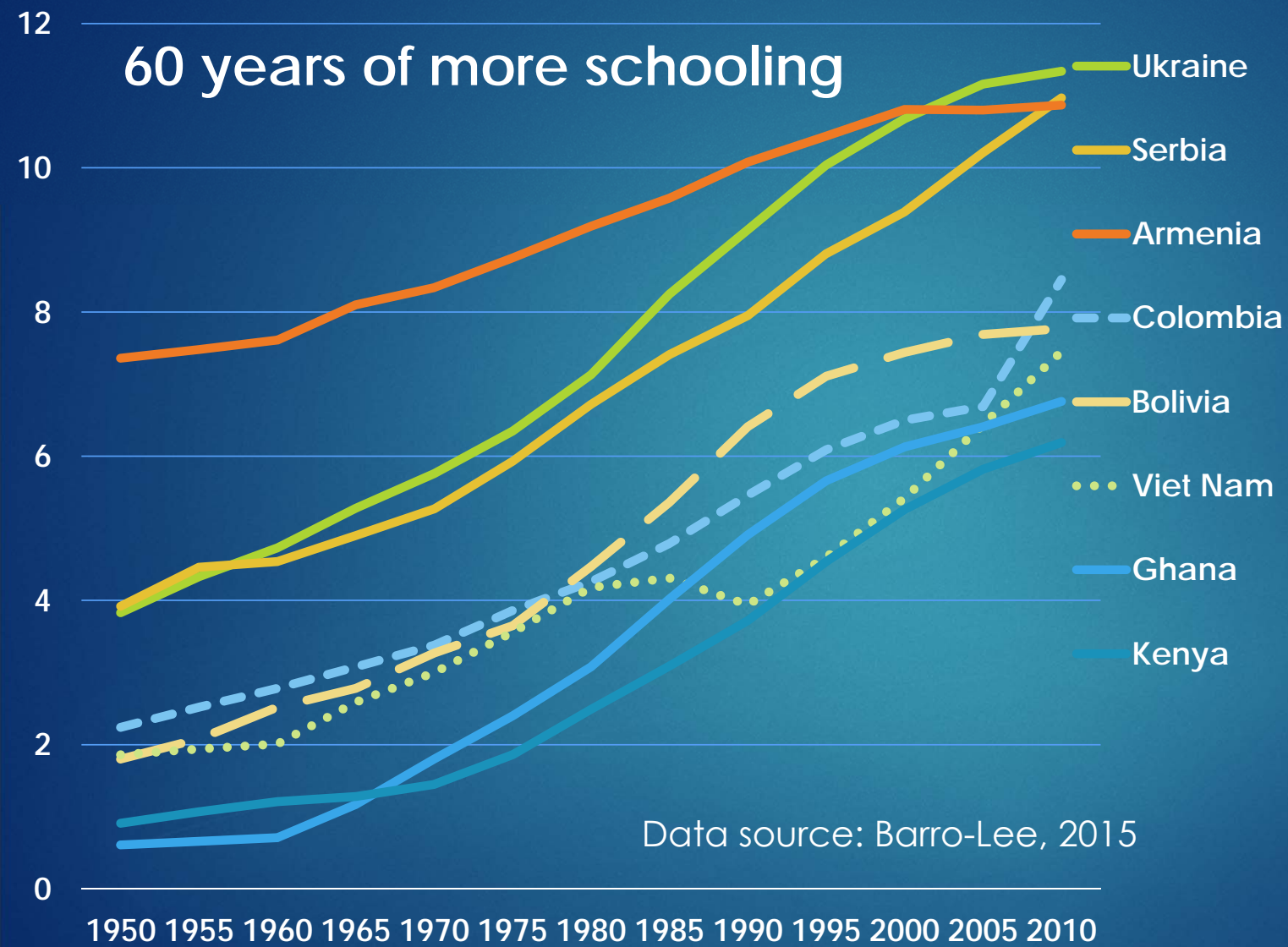
# Analytical approach

- ❖ Expanded measures of human capital—schooling splines, cognitive skills, noncognitive skills—using survey data
- ❖ Separate estimates of log-earnings functions for males and females
  - ▶ Tested for structural difference, rejected equality
  - ▶ OLS, and with correction for selection bias
- ❖ Quantile regressions – allowing estimates to vary along the conditional distribution of wages to examine whether returns to human capital measures differ for low and high earners

## Data used for analysis

- ❖ **Skills toward Employment and Productivity (STEP)** surveys in nine countries (Armenia, Georgia, Serbia, and Ukraine; Bolivia and Colombia; Ghana and Kenya; and Vietnam)
- ❖ Survey sample size: About 3,000 households per country, one randomly selected adult per household; ages 15-64, but analyzed only adults aged 25-54
- ❖ Surveys collected data on schooling, employment and family characteristics
- ❖ Human capital measures: completed years of schooling (splines with nodes at 9 years and 13 years), age (proxy for experience), measured cognitive skill (literacy), set of noncognitive / socioemotional / personality skills (z-scores)

# 60 years of more schooling



Since 1950, **education gender gap** (M-F) widened before narrowing in lower-middle-income countries

# Measuring cognitive skills

- ❖ Literacy assessment, developed for use in developing countries. Assessment includes sets of questions from OECD's International Program for Assessing Adult Competencies, the International Adult Literacy Survey, and the Adult Literacy and Life Skills to produce Reading Literacy Assessment Scores
- ❖ "Plausible values" of literacy proficiency are not assessment scores, but values imputed from a conditional distribution of assessment scores based on population characteristics
- ❖ Estimated returns to cognitive skills: Change in log-earnings associated with a 1 SD change in an individual's relative position in the population's distribution of cognitive skills (z-score)



# What's in a name?

Personality traits, attitudes, attributes  
(e.g., Dweck, Duckworth & co-authors)

Noncognitive skills (e.g., Heckman & co-authors)

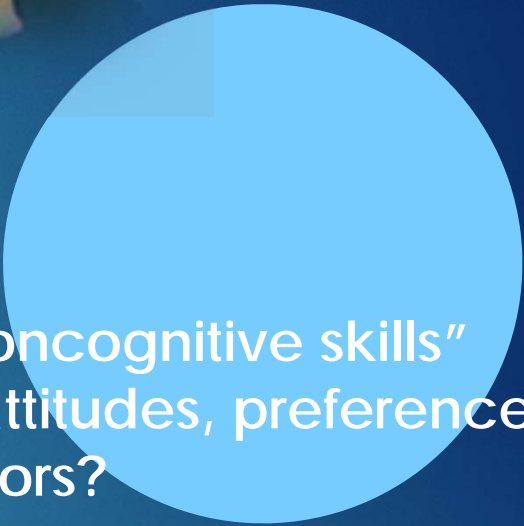
Psychological and socio-psychological factors (e.g., Bertrand & co-authors)

Psycho-social competencies (e.g., Dercon & Sanchez, 2013)

Socio-emotional skills (Education literature)

Soft skills (e.g., Lippmann & co-authors)

Life skills, 21<sup>st</sup> century skills (e.g., Care, Winthrop)



Are “noncognitive skills”  
traits, attitudes, preferences,  
behaviors?

Are they stable or dynamic?  
Do they change across one's  
lifetime?

# Measuring noncognitive skills

## Domains

Openness to experience

Conscientiousness

Extraversion

Agreeableness

Emotional stability

Grit

Decision making

Hostile attribution bias

Risk taking

Time preference

## Definitions

Appreciation for art, learning, unusual ideas, and variety of experience

Tendency to be organized, responsible, and hardworking

Sociability, tendency to seek stimulation in the company of others, talkativeness

Tendency to act in a cooperative, unselfish manner

Predictability and consistency in emotional reactions, with absence of rapid mood changes


Perseverance with long-term goals

Manner of approaching decision situations

Tendency to perceive hostile intent in others

Willingness to bear risk

Willingness to delay gratification



Do skills differ across countries and  
between men and women?

# Cognitive skills show gender differences

Comparisons across countries using differences between means and between distributions

	Comparison of means <sup>1</sup>			Comparison of distributions <sup>2</sup>		
Skills	Higher male scores	No significant gender difference	Higher female scores	Higher male scores	No significant gender difference	Higher female scores
Literacy proficiency	Bolivia Colombia Ghana Kenya	Armenia Serbia Vietnam	Georgia Ukraine	Bolivia Colombia Ghana Kenya	Serbia Vietnam	Armenia Georgia Ukraine


Scores for men significantly larger than women's only in non-former socialist countries. Women's scores exceed men's in former socialist countries.

Skills	Comparison of means <sup>1</sup>			Comparison of distributions <sup>2</sup>		
	Higher male scores	No significant gender difference	Higher female scores	Higher male scores	No significant gender difference	Higher female scores
<b>Extraversion</b>	Bolivia, Colombia, Kenya	Ghana	Armenia, Georgia, Serbia, Ukraine, Vietnam		Bolivia, Colombia, Ghana, Kenya, Vietnam	Armenia, Georgia, Serbia, Ukraine
<b>Conscientiousness</b>	Ghana, Kenya, Vietnam	Bolivia, Colombia	Armenia, Georgia, Serbia, Ukraine	Ghana, Kenya, Vietnam	Armenia, Bolivia, Colombia	Georgia, Serbia, Ukraine
<b>Openness</b>	Bolivia, Colombia, Ghana, Kenya, Serbia, Vietnam	Armenia	Georgia, Ukraine	Ghana, Kenya, Vietnam	Armenia, Bolivia, Colombia, Serbia	Georgia, Ukraine
<b>Emotional Stability</b>	Armenia, Bolivia, Colombia, Georgia, Ghana, Kenya, Serbia, Ukraine, Vietnam			Armenia, Bolivia, Colombia, Georgia, Ghana, Kenya, Serbia, Ukraine, Vietnam		
<b>Agreeableness</b>	Bolivia, Ghana	Colombia, Kenya, Vietnam	Armenia, Georgia, Serbia, Ukraine		Bolivia, Colombia, Georgia, Ghana, Kenya, Vietnam	Armenia, Serbia, Ukraine
<b>Grit</b>	Ghana, Kenya, Vietnam	Bolivia, Serbia	Armenia, Colombia, Georgia, Ukraine	Ghana, Kenya, Vietnam	Armenia, Bolivia, Colombia, Georgia, Serbia	Ukraine
<b>Decision making</b>	Colombia, Ghana, Kenya, Vietnam	Armenia	Bolivia, Georgia, Serbia, Ukraine	Ghana, Kenya, Vietnam	Armenia	Bolivia, Colombia, Georgia, Serbia, Ukraine
<b>Hostile attribution bias</b>	Vietnam	Armenia, Ghana, Kenya, Ukraine	Bolivia, Colombia, Georgia	Vietnam	Georgia, Ghana, Kenya, Ukraine	Armenia, Bolivia, Colombia
<b>Risk taking</b>	Armenia, Ghana, Kenya, Ukraine, Vietnam	Bolivia, Colombia, Georgia		Kenya, Ukraine, Vietnam	Armenia, Bolivia, Colombia, Georgia, Ghana	
<b>Time preference</b>	Vietnam	Armenia, Georgia, Ghana, Kenya, Ukraine	Bolivia		Armenia, Georgia, Ghana, Kenya, Ukraine, Vietnam	Bolivia

Notes: <sup>1</sup> From the results of means comparison t-tests; <sup>2</sup> From the results of Kolmogorov-Smirnov tests for the equality of

# Gender differences in noncognitive skills



- ❖ Men are more emotionally stable than women across all countries
  - ❖ Men are more risk-taking than women
  - ❖ More countries have no gender differences with respect to extraversion, grit, and time preference
  - ❖ Distinctive gender patterns In former socialist countries:
    - ▶ Women are more extraverted and agreeable than men (comparing distributions)
    - ▶ Women are more open to new experiences than men
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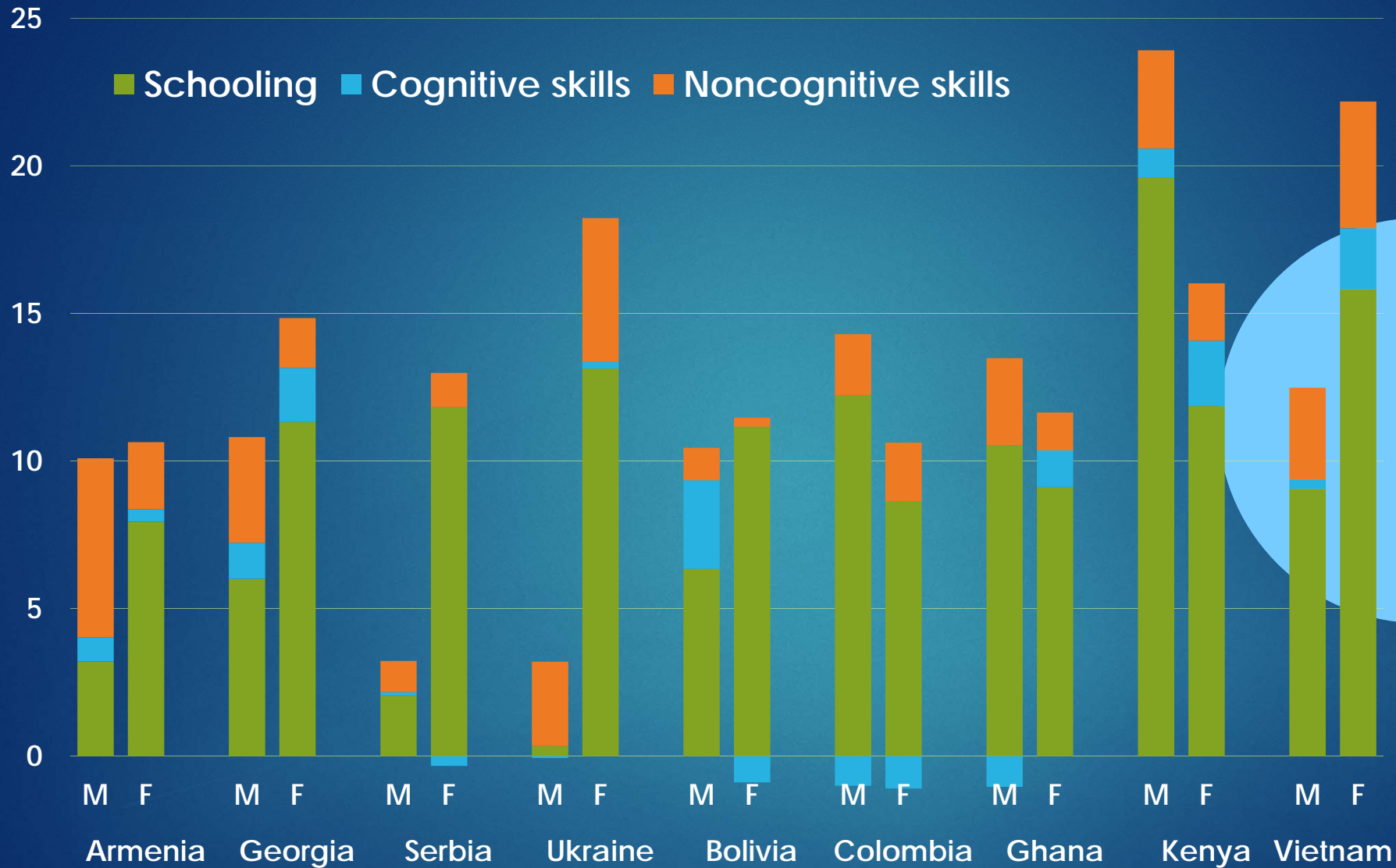
Do schooling and skills matter for earnings—  
and for men and women in the same way?

# Return to schooling is nonlinear



- ❖ Education as schooling spline variables to allow the return to a year of schooling to be different across three levels
  - ▶ Up to 9 years of schooling
  - ▶ Between 10-13 years of schooling
  - ▶ Above 13 years of schooling
- ❖ Modest or flat return up to 9 years of schooling, a steeper return between 10-13 years of schooling, and the steepest return to post secondary schooling.
- ❖ The return to postsecondary education for women is larger than for men—a **compelling argument for girls to continue education beyond secondary schooling.**





Fields decomposition:

Schooling and skills explain earnings of men and women in majority of countries

... as much as 24% of earnings of Kenyan men

# Skills account partly for returns typically attributed to years of schooling

- ❖ All measures of human capital account for as much as 22-24 percent of the total variance in the log-earnings of women and men, respectively
- ❖ Schooling accounts for much of this explanatory power, implying that schooling is still a smart investment, even in the countries where schooling levels are relatively high
- ❖ But the returns attributed to schooling are biased upward when skills are not taken into account

# Do skills matter for men and women in the same way?

Gender earnings gap narrows from 31% to 28% when both cognitive and noncognitive skills are accounted for.

It takes better cognitive and noncognitive skills for women to narrow the gender wage gap

# Cognitive skills count in the labor market, especially for women

- ❖ Controlling for years of schooling, significant return to cognitive skills (proxied by literacy assessment)
- ❖ Average return to cognitive skill is significant only for women.
- ❖ Based on quantile regressions, the return to cognitive skills is weakly significant for men across the earnings distribution, but strongly significant for women at the lower and middle end of the distribution.
  - ▶ For women at the lower half of earnings distribution, the return to a 1 SD gain (6-7 percent) is comparable to the return to an additional year of secondary education
- ❖ **Investments in quality that improve learning count more for girls**

# Do noncognitive skills matter for men and women in the same way?

- ❖ Yes, same for risk-taking and openness to new experience, but return to openness for men is larger
- ❖ Yes, hostile attribution bias has negative return for both men and women, but more strongly significant for men
- ❖ No, extraversion, conscientiousness, emotional stability: not significant for men, but significant and positive return for women
- ❖ No, extraversion, grit and risk-taking increase the probability of paid work only for women. (Extraversion is weakly significant for men.)
- ❖ No, agreeableness reduces the probability of paid work for men, but not for women

# Do skills matter in the same way across the earnings distribution?

- ▶ Openness to experience pays more for men who earn lower (median or below) than higher wages, but it pays more for women who earn higher wages (median and 75<sup>th</sup> percentile).
- ▶ Extraversion counts only for men at the 75<sup>th</sup> percentile, but for women at the 10<sup>th</sup> percentile.
- ▶ Hostile attribution bias has a more negative effect at the lower end of the wage distribution for both men and women.
- ▶ Risk taking is only weakly significant for women. For men, it pays more at the 90<sup>th</sup> percentile.

# But more schooling and better skills do not eliminate the gender wage gap

- ❖ Institutional factors such as wage structures reward women's human capital systematically less than men's.
- ❖ The decomposition of the gender wage gap into a covariates (human capital) gap and a coefficients gap indicates that, in the majority of countries, the coefficients gap dominates the covariates gap.
- ❖ And the coefficients gap is relatively larger at the lower end of the earnings distribution, especially in non-former socialist countries—a “sticky floor” rather than a “glass ceiling.”

## Some policy conclusions

- ▶ For women, schooling and cognitive skills are stronger signals in the marketplace than noncognitive skills (asymmetric information), so investments that improve learning for girls, especially more secondary and postsecondary education. By contrast, for men, noncognitive skills are relatively stronger signals, especially in countries with higher schooling levels.
- ▶ In the former socialist countries: a larger share of women in formal employment and policies such as minimum wage laws can mitigate gender wage gaps that may be due to discriminatory behaviors of employers.
- ▶ In the other countries, more women are in informal work which has lower protection from discrimination
- ▶ For further research: research on expanded human capital measures is still nascent in developing countries. More measurement and more experimental work, attention to heterogeneity of returns, needed.



Thank you

