

Education and Skills Mismatch in Developing Countries: Magnitudes, Explanations, and Impacts

Results from the World Bank STEP Surveys

Michael J. Handel

U.S. Bureau of Labor Statistics

Department of Sociology, Northeastern University

m.handel@neu.edu

Rationale for mismatch research

Persistent concerns in OECD countries (over decades)

- Job skill requirements high and rising (accelerating?)
- Education quality too low, rising too slowly, or falling
- Worker skills are struggling to keep pace with job changes

But research literature finds overeducation more common
More shortage of skilled jobs than skilled workers

Research on developing countries is sparse, generality of results and influence of distinctive contexts unknown

STEP samples

- **Urban households** (mostly)
- **Random sample, working age** (age 15-64)
- **Background survey + reading assessment** (some countries, based on PIAAC)
- **Separate employer survey** (some countries)

12 countries, almost all major regions (2012-2013)

- | | |
|----------------------------------|--------------------------------|
| 1. Ghana (n=2,070) | 7. Bolivia (n=1,206) |
| 2. Kenya (n=1,956) | 8. Colombia |
| 3. China—Yunnan (n=1,268) | 9. Armenia (n=972) |
| 4. Lao (n=1,283) | 10. Georgia (n=906) |
| 5. Sri Lanka (n=579) | 11. Macedonia (n=1,751) |
| 6. Vietnam (n=2,183) | 12. Ukraine (n=941) |

Serbia, Kosovo, and Philippines are in process

Distinctive issues in developing country contexts

- **Very high rates of informality, self-employment, micro-firms**
(55%-80%)
- **Very low employment rates among working age population**
(Europe/Central Asian countries, S. Asia) (33%-55%)
 - creates selection issues
 - unemployment/inactivity a form of mismatch
- **Both reflect very weak job market, low job generation**
(or gender dynamics)

Persistent methodological issue

How to measure mismatch?

- **education level** (various methods)
- **skill level** (various methods)

Many ways to compare workers and jobs → different results

Measure person and job characteristics on same scale to permit **direct person-job comparisons** (not always possible, e.g. test scores)

Focus will be on education mismatch

Personal attainment vs. Reported job educ. requirements

Source: Michael J. Handel, Alexandria Valerio, and Maria Laura Sanchez Puerta, Accounting for Mismatch in Low- and Middle-Income Countries: Measurement, Magnitudes, and Explanations. (2016, World Bank)

Examples of STEP job task measures

Reading, Writing

Level

1. Anything
2. Length of longest document read normally (<1 page, 2-5, 6-10, 11-25, >25)

Kind

- Forms, bills
- Manuals, reports
- Newspapers, magazines, books

Math

Level

1. Anything
2. Measure sizes, weights, distances, calculate prices/costs
3. Use/calculate fractions, decimals, percentages
4. Other multiplication, division
5. Advanced math (e.g., algebra, geometry, trigonometry)

General cognitive

Problem-solving: How often perform tasks requiring 30 minutes thinking to figure out what to do (e.g., mechanic fixing a car) (never-every day)

Non-objective measures?

Best to avoid

- **‘Does your main job involve complex tasks’** (yes/no)
 - European Working Conditions Survey (EU) (1990-present, every 5 years)
- **‘My job is complex and difficult’** (strongly agree-strongly disagree)
 - Household, Income and Labour Dynamics (HILDA) (Australia’s panel survey)

Items apply to everyone, but not very explicit—too general, subjective

Low information content—not clear what answers mean

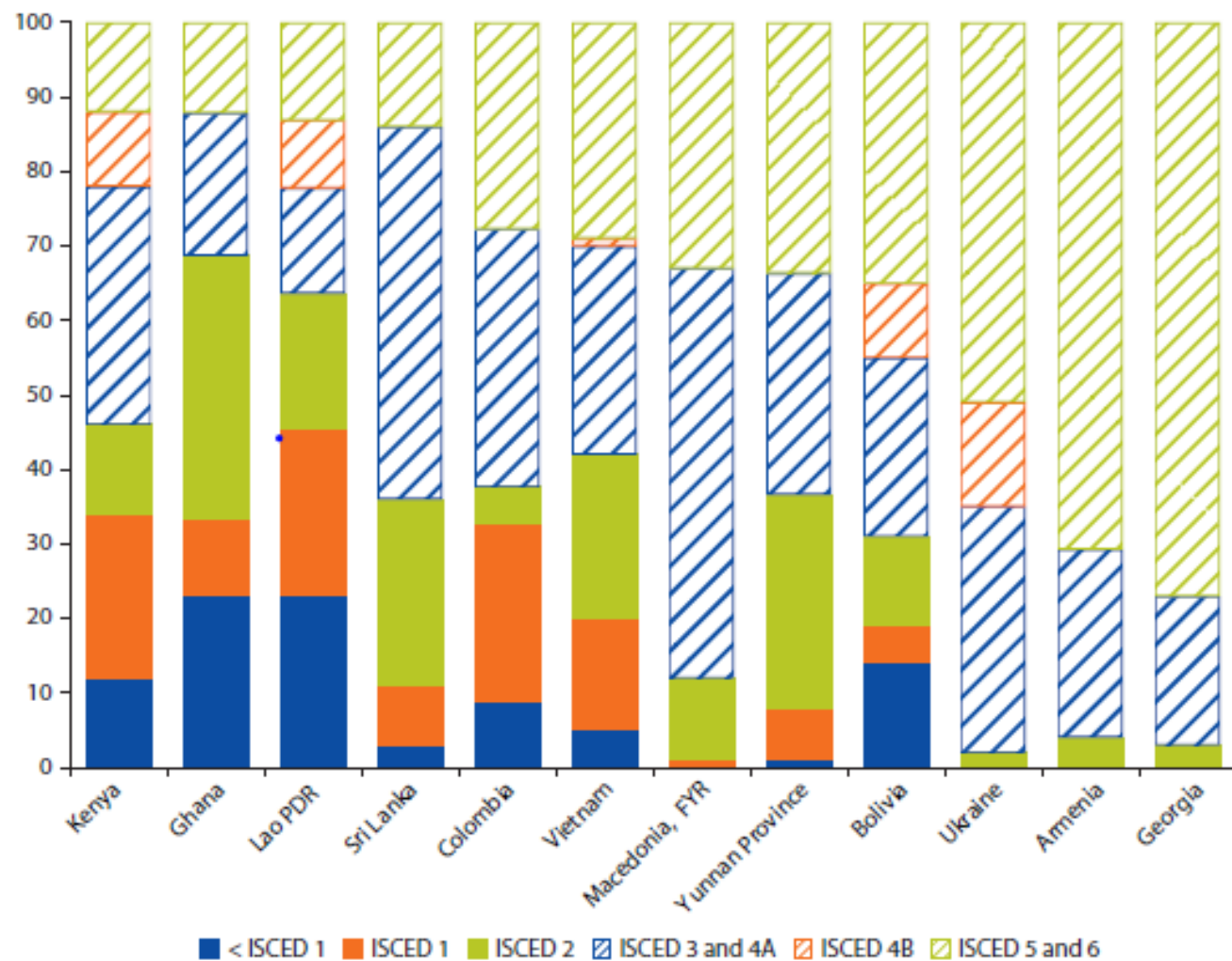
Michael J. Handel (2017), “Measuring Job Content: Skills, Technology, and Management Practices,” in Oxford Handbook of Skills and Training, John Buchanan, et al., eds. Oxford: Oxford University Press.

Focus

- 1. Incidence of mismatch in developing countries**
- 2. Explanations**
 - A. Small when measured correctly** (frictions, transitory, “preferences”)
 - B. School failure** (low achievement, “wrong” fields of study)
 - C. Job market failure** (low employment rates, low investment → informality)
- 3. Consequences of mismatch**

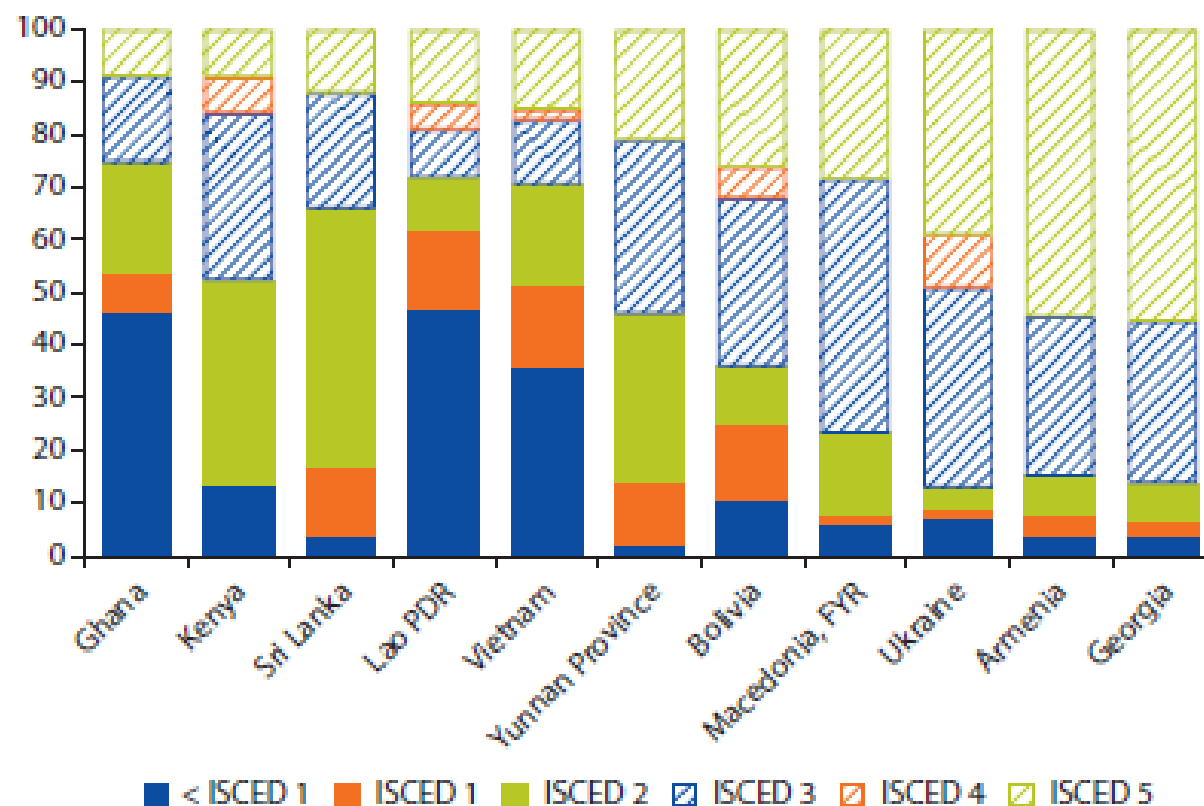
Education of employed persons, STEP countries

Figure 5.1 Educational Distribution of Employed Persons, by STEP Country
percent



Education required by job across STEP countries

Figure 5.3 Distribution of Jobs by Job-Required Education Levels, by STEP Country
percent



Source: World Bank STEP Skills Measurement Program.

Match and Mismatch rates, STEP countries

Table 5.2 Individual-Level (Actual) Match Rates, by STEP Country

	1	2	3	4	5	6
	<i>Well-matched</i>	<i>Over-educated</i>	<i>Under-educated</i>	<i>Actual mismatch</i>	<i>Aggregate mismatch</i>	<i>Difference (column 4 minus column 5)</i>
Lao PDR	45.1	41.1	13.7	54.9	27.0	27.9
Ghana	47.7	39.5	12.8	52.3	22.3	30.0
Kenya	34.5	24.9	40.4	65.5	29.9	35.6
Bolivia	40.1	34.6	25.2	59.9	19.8	40.1
Vietnam	26.0	70.0	4.0	74.0	33.7	40.3
Sri Lanka	43.5	46.1	10.4	56.5	33.8	22.7
Yunnan Province	56.6	32.6	10.7	43.4	11.9	31.5
Macedonia, FYR	72.6	22.3	5.1	27.4	11.2	16.2
Armenia	66.2	28.0	5.8	33.8	16.0	17.8
Georgia	66.4	29.4	4.0	33.4	21.2	12.2
Ukraine	72.1	24.0	3.8	27.9	13.1	14.8
Mean	51.9	34.2	12.4	48.1	21.8	26.3

Source: World Bank STEP Skills Measurement Program.

One point calling for more explanation...

Over-education more common than under-education in low- and middle-income countries, as well as OECD

Lower prevalence of under-education may be explicable—overqualified more likely to be hired than underqualified

But why so much over-education in low-education countries, when policy advice emphasizes raising education levels?

Same issue in OECD countries—how to reconcile rising university premium with persistent underutilization of university graduates?

If there is shortage of tertiary grads, why are so many not absorbed?

Match and Mismatch rates, STEP countries

Figure 5.5 Rates of Over-Education, by Country
percent

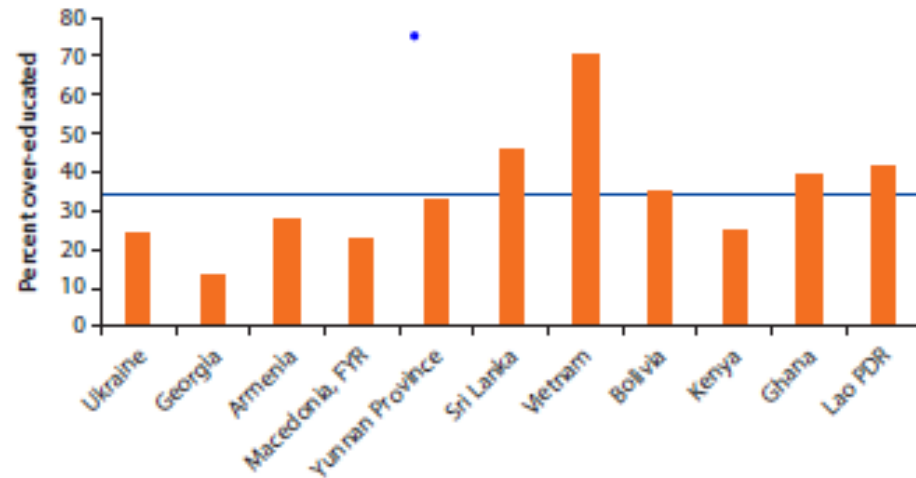
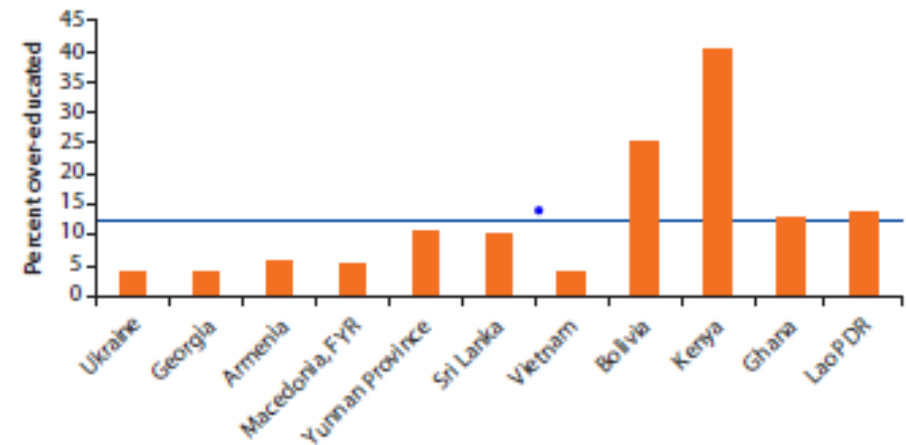


Figure 5.6 Rates of Under-Education, by Country
percent



Different forms of possible match and mismatch

		Job skill requirements		
Worker skills		Low	Medium	High
Low		1	2	3
Medium		4	5	6
High		7	8	9

(1) Low-skill match (**worst**)

(5) Medium-skill match

(9) High-skill match (**best**)

(2,3,6) Job skill requirements > worker skills

Firms lower hiring standards (**under-education**)

(4,7,8) Jobs requirements < worker skills

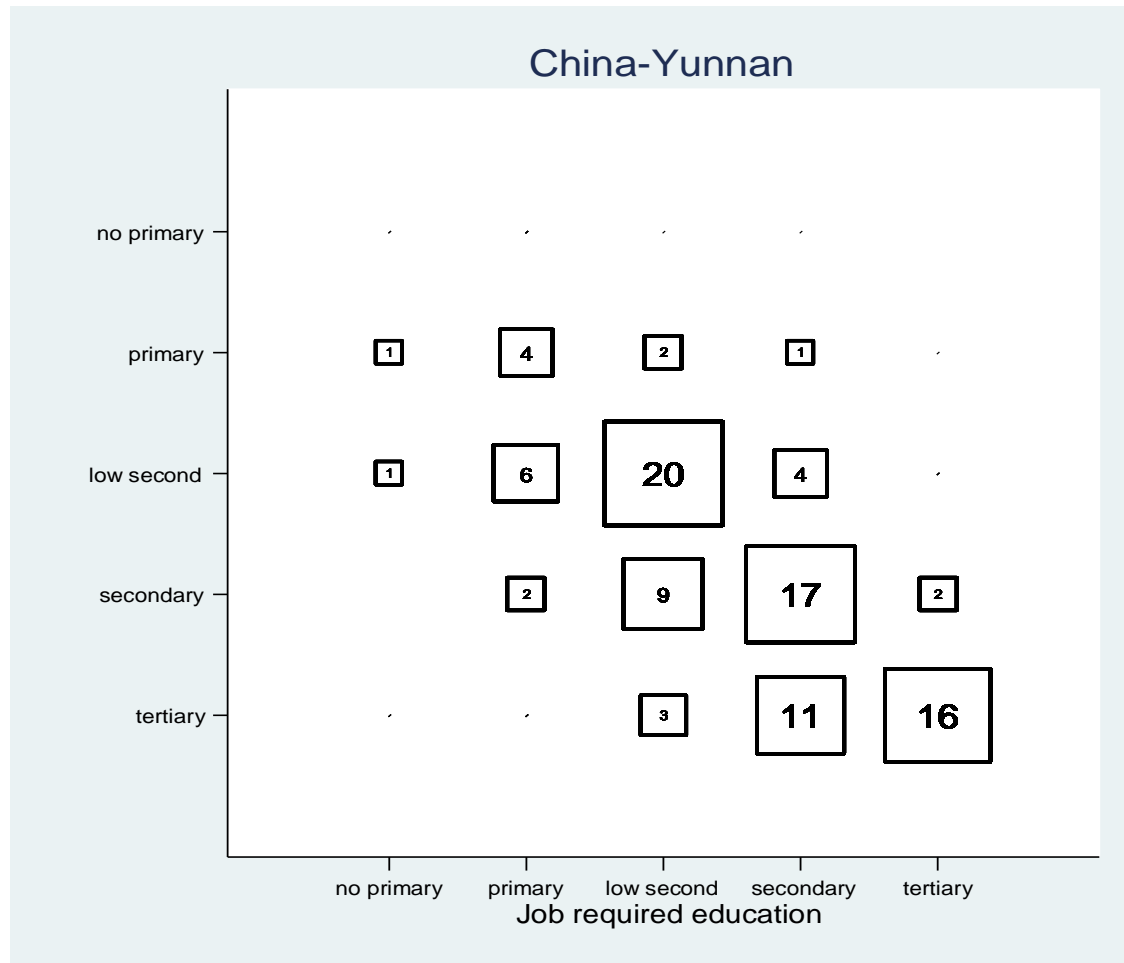
Workers lower job expectations (**over-education**)

Matches on diagonal—but not all are desirable: (1) is worst-case, (9) is best case

Ranking of under-education and over-education more ambiguous (but not optimal)

This model of match and mismatch is starting point and focus here,
Skills = Education

Worker education vs. job required education

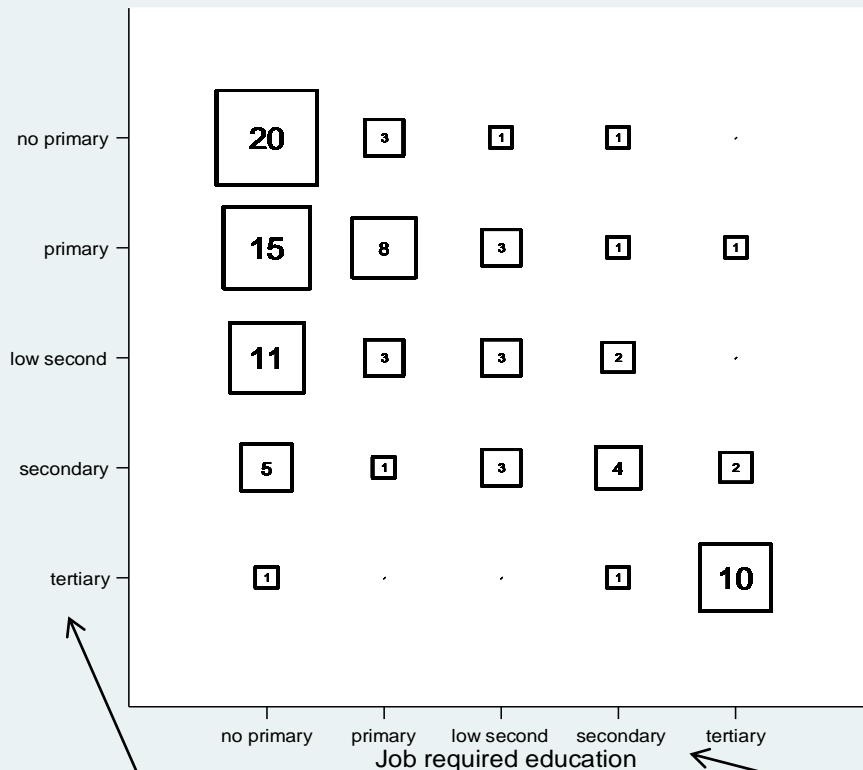


Worker education (rows) **by**
Education required for job (columns)
 (figures sum to ~100)

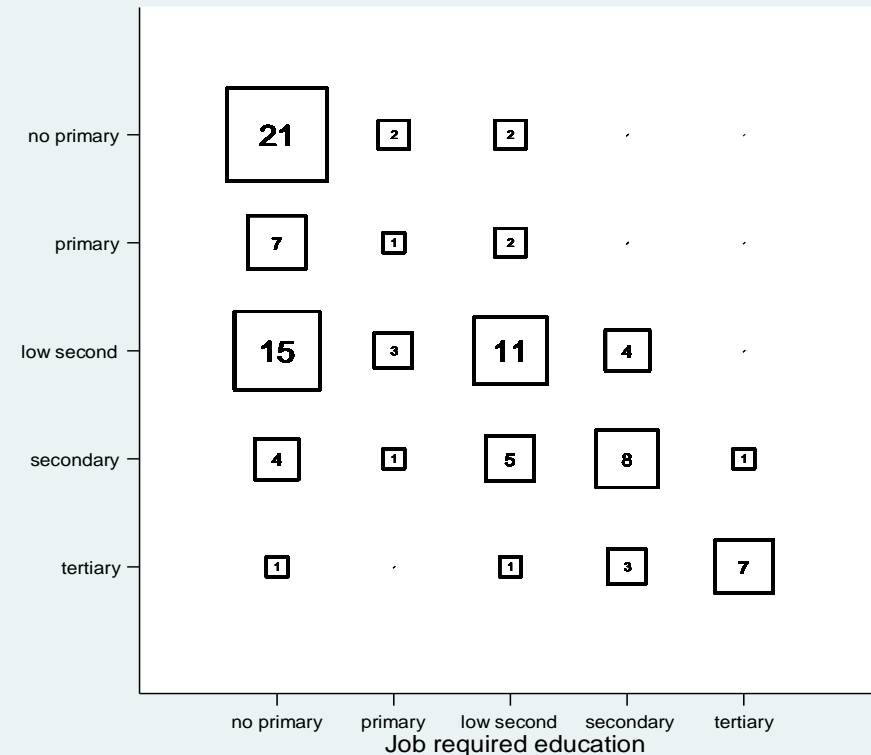
Matches: Diagonal cells
Overeduc: Left of diagonal
Undereduc: Right of diagonal

Joint Distribution of Worker Education by Job Education (cell percentages sum to ~100)

Laos



Ghana



Worker education categories on y-axis

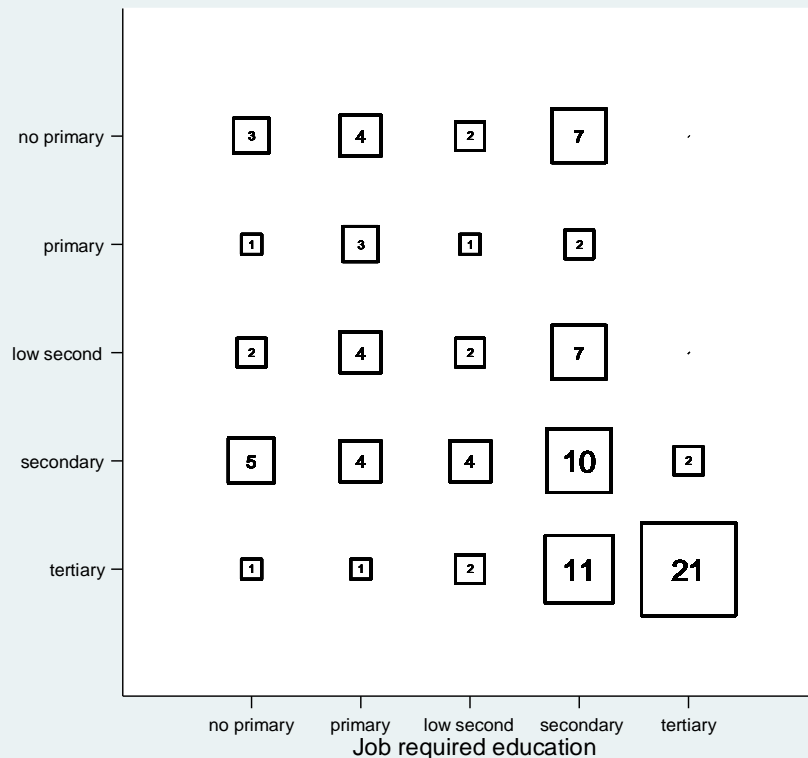
Job required education on x-axis

Lao: large share of well-matched workers with < primary education, large groups of more-educated workers also in jobs requiring < primary education (over-educated).

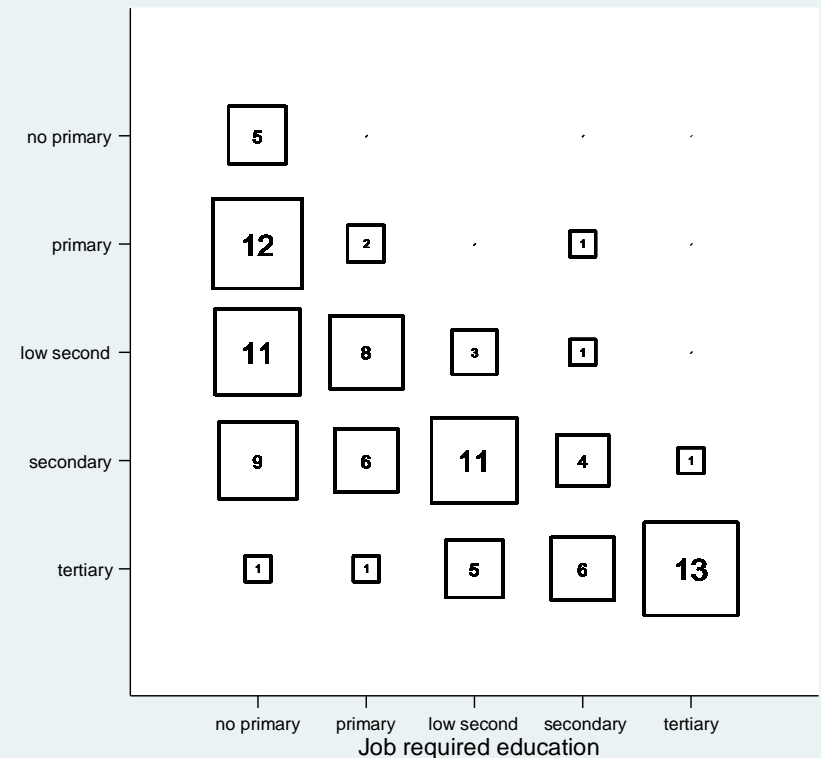
Ghana: similar pattern, somewhat less pronounced

Significant underutilization of current workers' education before controlling for covariates

Bolivia



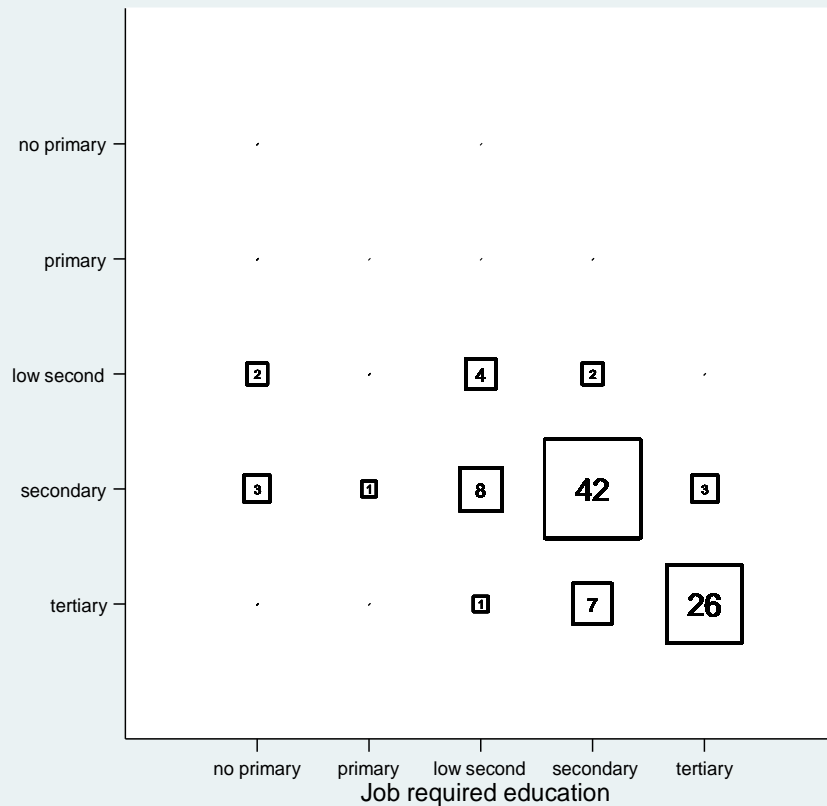
Vietnam



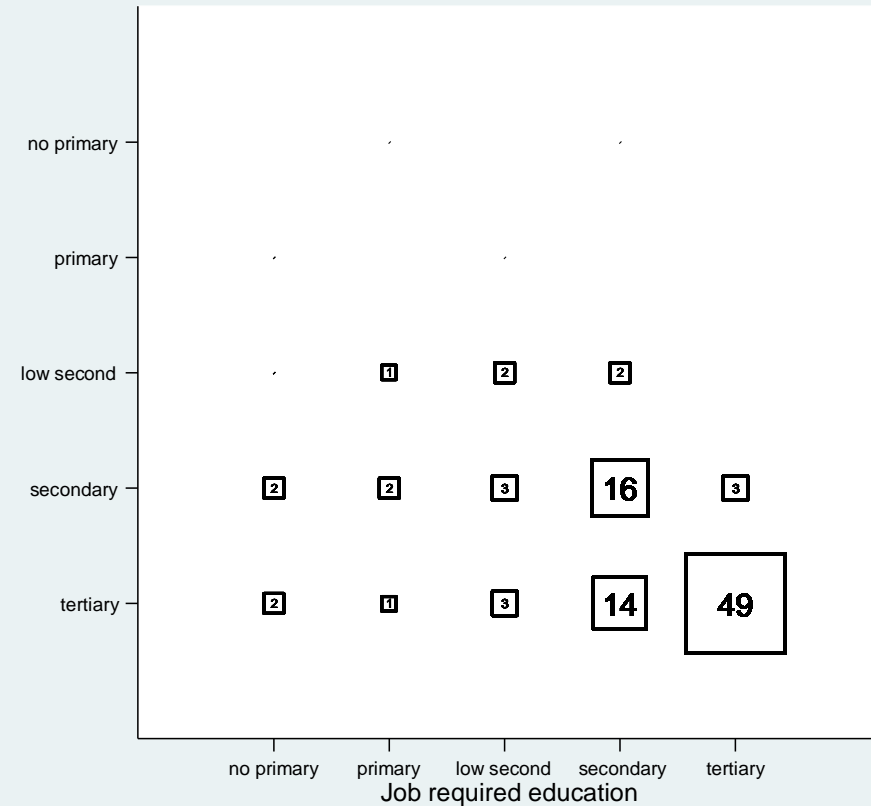
Bolivia: large share with < primary education in jobs requiring more education (under-educated). Over half of workers with secondary education are evenly distributed across jobs requiring less (over-educated). 42% of tertiary grads have jobs requiring \leq secondary education (over-educated)

Vietnam: surprisingly few on diagonal, many report jobs require less education than they have; very high share overeducated

Macedonia



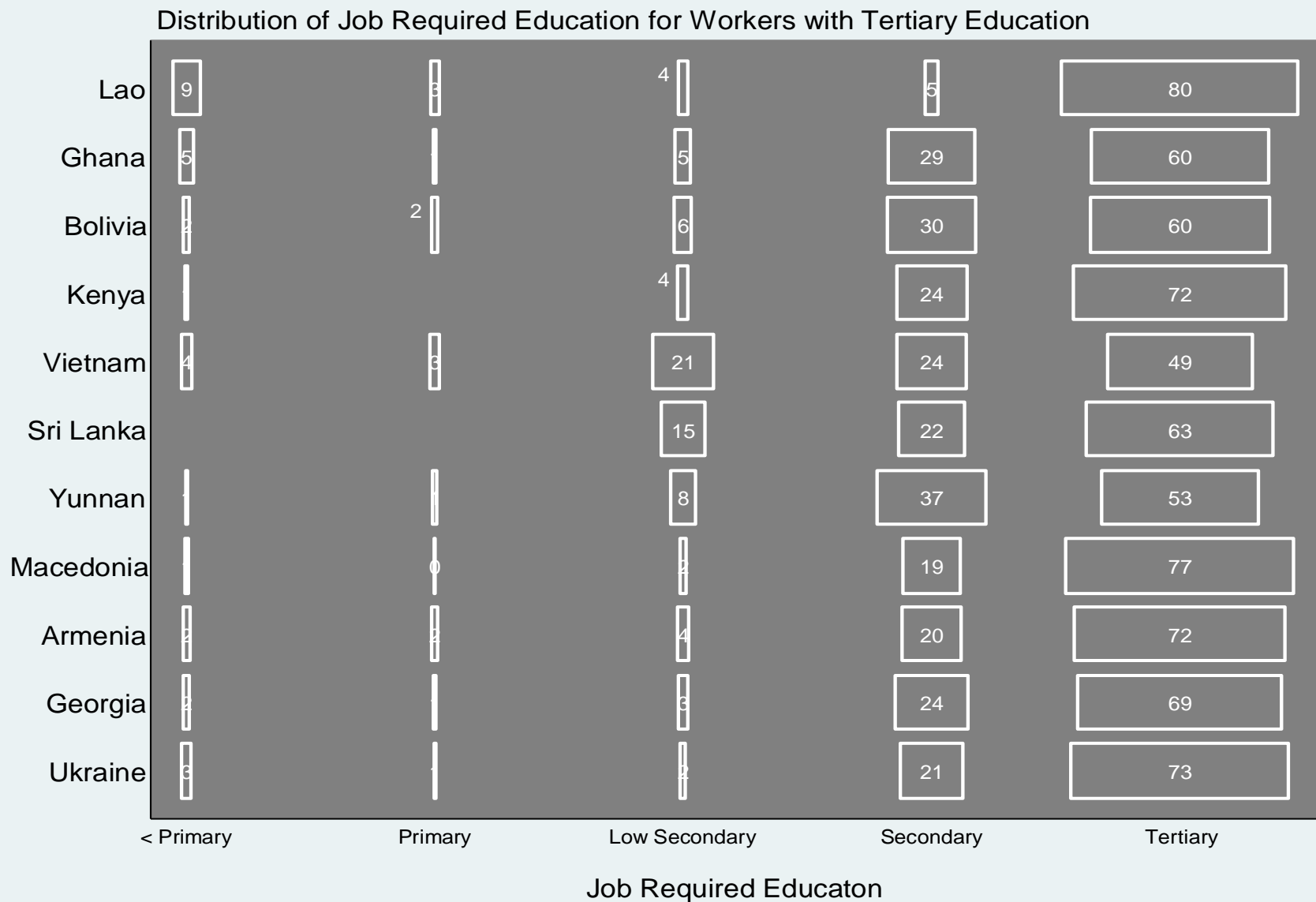
Armenia



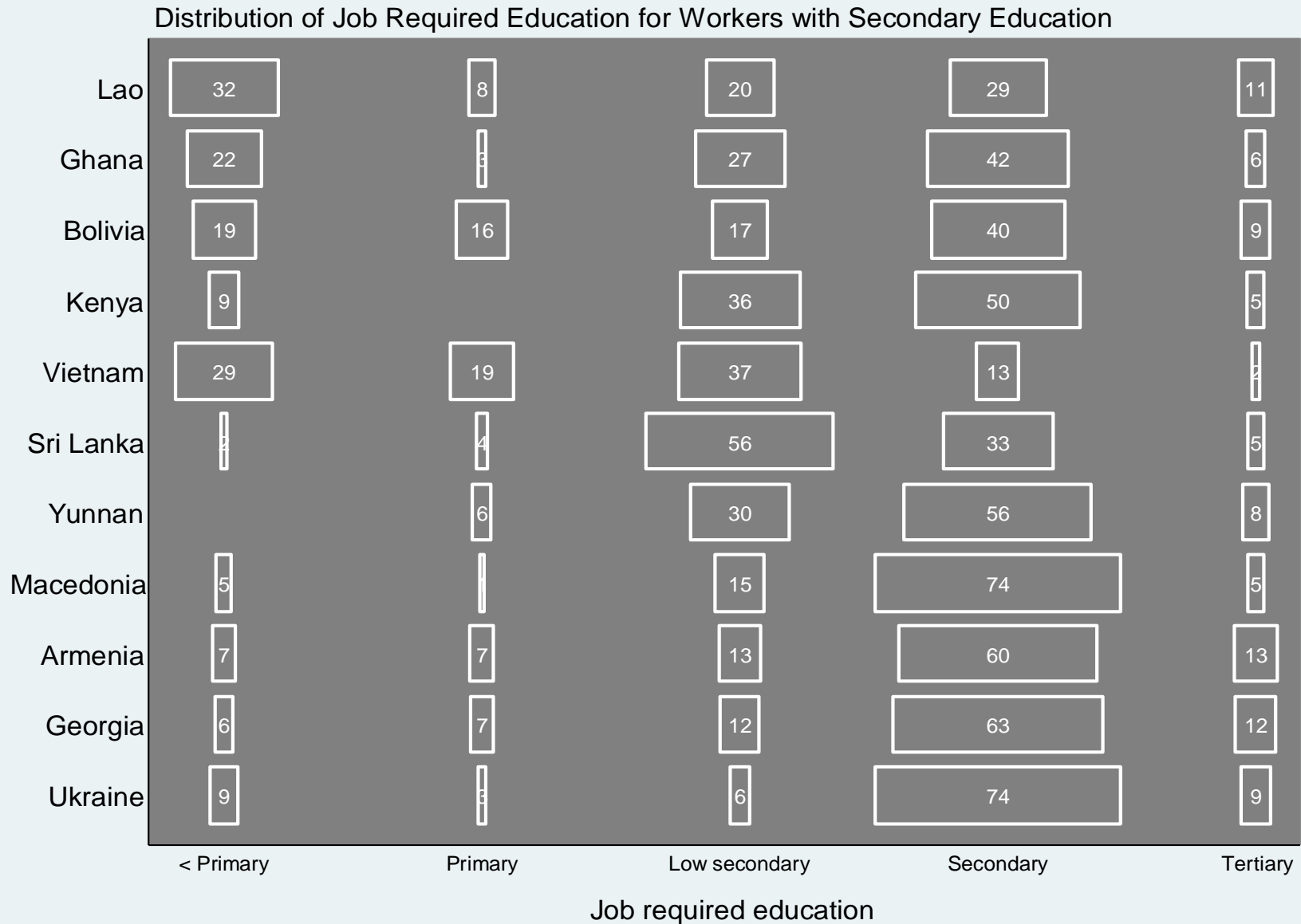
Macedonia: workers with secondary and tertiary educations in jobs requiring less education (under-educated) but workforce otherwise well-matched at relatively high skill level.

Armenia: greater mass of workers at tertiary level → larger group of workers with tertiary education who are over-educated. The profiles for Georgia and Ukraine are very similar.

Job required education of tertiary graduates, all countries (rows sum to 100)



Job required education of secondary grads, all countries (rows sum to 100)



Looking at both workers and jobs

Skills problem? (amount, kind, generality)

- **Not enough post-primary**
 - Only older cohorts? (not much to be done)
- **Not enough tertiary**
- **Low functioning despite educ . level**
 - Test scores within educ group (foundation skills)
- **Wrong type of education** (field, genrl vs. specific)
 - Too few valuable high skills (STEM, health, mgt)
 - Too few middle skills (clerical, skilled BC, IT)
 - Too much general educ vs. voc ed? **The eternal question....**
 - Not enough occupation-specific skills?
 - Diseconomies of scale a problem
 - Not enough transferable skills?
 - Flexibility vs. specialization
 - Voc ed limit or reinforce foundation skills?

Educational effectiveness

Jobs problem? (quantity and quality) *But what about the employment side?*

- **Absolute job scarcity** (quantity)
 - inactive, un(der-)employed, informal
 - weak macro, crises/shocks (fin, oil, trade), TNC/local investment, infra, policies, institutional capacity, governance, conflict
- **Education level required by job**
 - ISCED 0, 1, 2, 3, 5+
- **Actual level of task demands**
 - foundation skills, IT, other technology
- **Types of knowledge demand** (ISCO)
 - High: STEM, health, other prof./mgt.
 - Middle: clerical, skilled BC
 - Vocational education needed (ISCED 4)
- **General/specific** (low levels of firm training?)
- **Employer strategy, industry, resources**
 - manufacturing, value-chain rank, HR, tech

Job quantity and quality

Drivers

Some mismatch may be due to

- **frictions** (imperfect information—the “right” workers/firms can’t find ea other)
- **transitory business cycle** (unemployed take any job)
- **life cycle stage** (youth, age)
- **work/family preferences** (women, mothers w/young children)
- **social exclusion** (SES, minorities, immigrants)

...but might also reflect problems with

- **education** (education level, achievement, field of study)
- **job market** (low employment rates, low investment → informality, low-quality jobs, low-skill equilibrium)

Logistic regression models of under- and over-education

Predictors

- **Education**

- level of education, years of tertiary
- field of study
- literacy test score (available countries)

- **Job market**

- public vs. private sector
- formal vs. informal employee, informal self-employed

- **Life cycle stage**

- middle age vs. young, older workers

- **Work/Family preferences**

- voluntary part-time
- men vs. women with and without young children
- limiting health issues

Logistic regression models predicting over-education

Predictors

- **Education**

- level of education, years of tertiary Strong effects ✓
- field of study Weak effects
- literacy test score (available countries) Moderate effects

- **Job market**

- public vs. private sector Strong effects ✓
- formal vs. informal employee, informal self-employed Strong effects ✓

- **Life cycle stage**

- middle age vs. young, older workers

- **Work/Family preferences**

- voluntary part-time Weak effects
- men vs. women with and without young children Moderate effects
- limiting health issues Weak effects

Table 6.12 Logistic Regressions Predicting Mismatch, by Country—Vietnam*t-statistics in parentheses*

Other predictors to be added

- **Frictions**
 - search methods (networks, internet)
 - firm/establishment size
- **Business cycle**
 - local unemployment rate
 - recently unemployed
- **Social exclusion**
 - socio-economic background
 - minority language
 - immigrant status

Is mismatch genuine?

Is the “subjective” measurement method valid?

Do over-educated workers really perform mostly lower-skill tasks

Does task complexity of mismatched tertiary grads reflect mostly their personal education or their jobs?

Task measures show jobs of mismatched tertiary much more similar to upper secondary than to well-matched tertiary.

Is mismatch genuine?

Does task complexity of mismatched tertiary grads reflect mostly their personal education or their jobs?

Table 6.16 Rates of Reading Complexity, by Match Group and Country
percent

		Reading length				Reading type			
		3, 3	5, 3	5, 5	Gap ratio	3, 3	5, 3	5, 5	Gap ratio
Armenia	Low	86	75	35	0.779	65	64	20	0.973
	High	7	13	43	0.827	12	13	41	0.970
Bolivia	Low	78	65	21	0.773	55	44	9	0.775
	High	12	20	72	0.868	12	23	59	0.771
Colombia	Low	80	73	32	0.850	41	38	14	0.907
	High	12	17	52	0.871	25	32	51	0.753
Georgia	Low	85	86	38	> 1.0	77	75	25	0.964
	High	7	10	46	0.928	10	13	31	0.850
Ghana	Low	68	58	39	0.663	42	24	10	0.429
	High	18	35	48	0.427	23	54	56	0.065
Mean	Low	67	60	29	0.726	39	32	10	0.670
	High	14	23	48	0.677	25	34	54	0.631
Median	Low	72	63	29	0.779	41	31	9	0.710
	High	12	20	48	0.827	25	35	59	0.753

Source: World Bank STEP Skills Measurement Program.

Groups:

Matched upper secondary (3,3)

Mismatched tertiary (5,3)

Matched tertiary (5,5)

Gap ratio: $\frac{(5,5) - (5,3)}{(5,5) - (3,3)}$

Ex. $(35-75)/(35-86) = 0.78$

Task measures show jobs of mismatched tertiary much more similar to upper secondary than to well-matched tertiary.