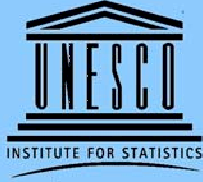


Gender disaggregated S&T statistics and indicators

**WORKSHOP ON
SCIENCE, TECHNOLOGY AND INNOVATION INDICATORS:
TRENDS AND CHALLENGES IN SOUTH EASTERN EUROPE**

27-31 March 2007, Skopje.



Outline of the presentation

- Objectives and Introduction
- Measuring STG
- Availability of STG statistics: Sex-disaggregated data in different sources
- Overview of Women in Education
- Women in science, a statistical overview: Data disaggregation, Cross-country comparability, Analyze existing data, Improve country awareness regarding STG data collection, Identify information gaps
- Other indicators on STG: Description and conceptualization of key variables and problem areas, Assess the current indicators in terms of scope and quality



Objectives

- to discuss the importance of statistics for evidence based policy and decision making
- to discuss necessity of sound statistical system/capacity building activities
- to conduct a substantial analysis on the general issues of STG information, statistics and indicators.

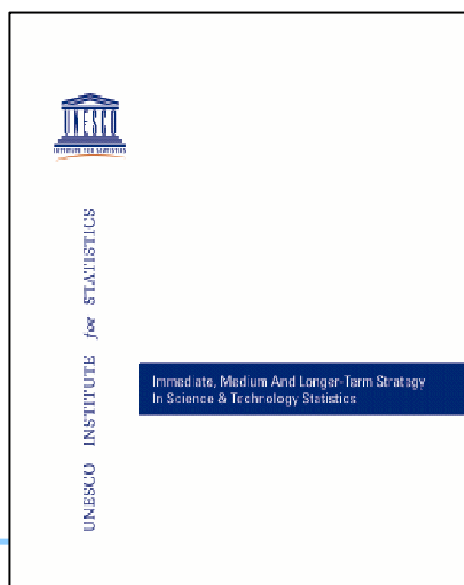


The Gender Gap, an Issue at All Levels

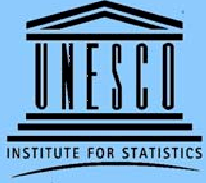
- EFA Global Monitoring Report 2003/4: Gender and Education for All – THE LEAP TO EQUALITY
- **WOMEN IN SCIENCE AND TECHNOLOGY:** A policy issue raising more and more attention worldwide:
 - European Union (How to meet “Barcelona target”?)
 - NSF (“Realizing America’s Potential”)
 - UNESCO:
 - 1999 World Conference on Science, “A new development?”.
 - International Report on Science, Technology and Gender - 2005 (IRSTG).
- ***Therefore, there is an increasing demand for cross-nationally comparable indicators on “Women and Science”.***

Women and S&T at the UIS

- *Mainstreaming gender issues is one of the top priorities identified in the recent International Consultation on S&T Priorities and Information Needs carried out by the UIS.*
- The UNESCO Institute for Statistics (UIS) **Immediate, Medium and Longer-Term Strategy in Science and Technology Statistics** document states in its “**Immediate term data and indicator priorities**”:



*“Special attention will be paid to **gender mainstreaming** in S&T, including the production and analysis of indicators and disaggregated data by gender.”*



Sex-disaggregated Statistics for Evidence Based Policy

- Concepts, definitions, criteria for classification and survey methods have extensively been examined and often revised to improve the measurement of all aspects of women's and men's lives
- Gender Statistics reflect social progress from the perspective of gender equality
- Examine gender concerns and goals in society

However, lack of significant official data with sex breakdowns constrain the ability to design and implement policies directed to these areas



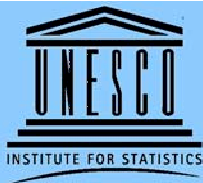
Measuring STG: Capacity building

- Lack-of-policy-priority -> lack-of-statistics->lack-of-awareness
- Data collected are critically dependent upon the statistical capacities of relevant government departments and agencies within countries
- Weak statistical capacities and inadequate information
- Improve capacities for data collection, processing, quality control, analysis and dissemination
- Awareness-raising activities in order to help bring STG issues into the main policy agendas
- Capacity building activities in this field need to be coupled with general S&T statistics capacity building projects

International organizations have a central role to play, encouraging countries to mainstream the gender dimension into data collection instruments and procedures

Measuring STG: Progress

- UNESCO has recommended collection of data on R&D personnel by gender from the beginning:
 - Recommendation concerning International Standardization of Statistics on Science and Technology (UNESCO 1978)
 - UNESCO Manual for Statistics on Scientific and Technological Activities (1984)
- EU created (2001) a sub-group to the Helsinki Group of Women and Science.
- Eurostat has introduced sex-breakdown into R&D surveys: in 2002 for member states and 2001 for candidate countries.
- OECD started collecting data with gender breakdown (2002).
- ‘Legal Basis on Science and Technology and Innovation Statistics’: collection of sex-disaggregated data on S&T by EU was confirmed with the decision of the European Parliament in 2003.
- OECD Frascati Manual is only now (2003 Edition) recommending the breakdown by sex of national HR data.
- UIS is collecting more data with gender breakdowns: one of the immediate term data and indicators priorities which is stated in the UIS **Immediate, Medium and Longer-Term Strategy in Science and Technology Statistics** document (2003)
- Harmonizing R&D data collection into a common survey by OECD/Eurostat.



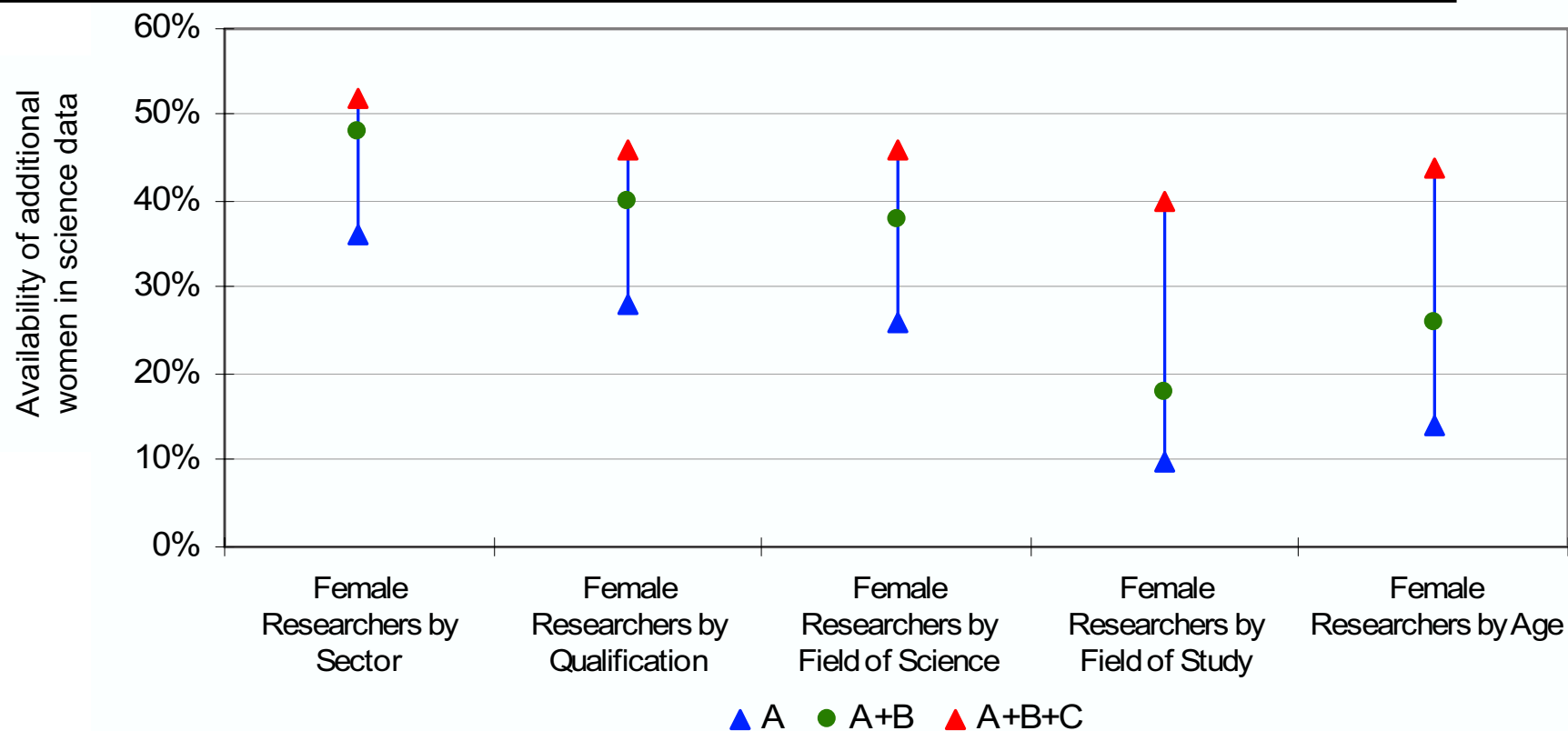
Availability of Sex-disaggregated Data on Researchers

- **UIS:**
 - R&D Personnel (Total R&D Personnel, Researchers and Technicians).
- **OECD:**
 - Researchers (HC), R&D Personnel by occupation and sector (HC) and Total R&D personnel by qualification and sector (HC).
- **Eurostat & European Commission:**
 - R&D Personnel by occupation and sector (HC and FTE); Total R&D Personnel and Researchers by field of science and sector (HC and FTE); Total R&D Personnel and Researchers by qualification and sector (HC and FTE); Researchers by age and sector (HC); Researchers by citizenship and sector (HC); Business enterprise sector R&D Personnel by occupation and economic activity (HC and FTE), Researchers by size class (according to number of employees) in Business enterprise sector, Members of scientific boards and Applicants & beneficiaries of research fund.

In addition to R&D data, Eurostat and OECD also have data on employment in science and engineering, 'Human Resources in Science and Technology – HRST' with gender breakdowns.

Availability of Additional Sex-disaggregated Data on Researchers

The availability of gender-disaggregated data for certain variables such as Researchers by Sector, Qualification and Field of Science is on the rise



Note - A : Already available-by 2004, B : Available from 2005 on, and C : Possibly available before 2008

Source : UIS Questionnaire on women in science statistics

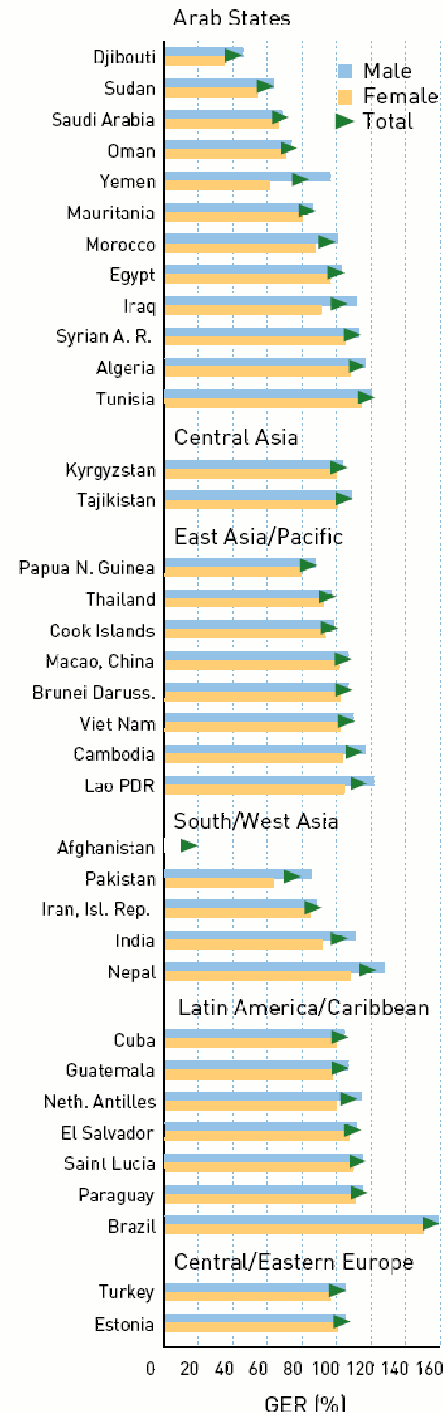
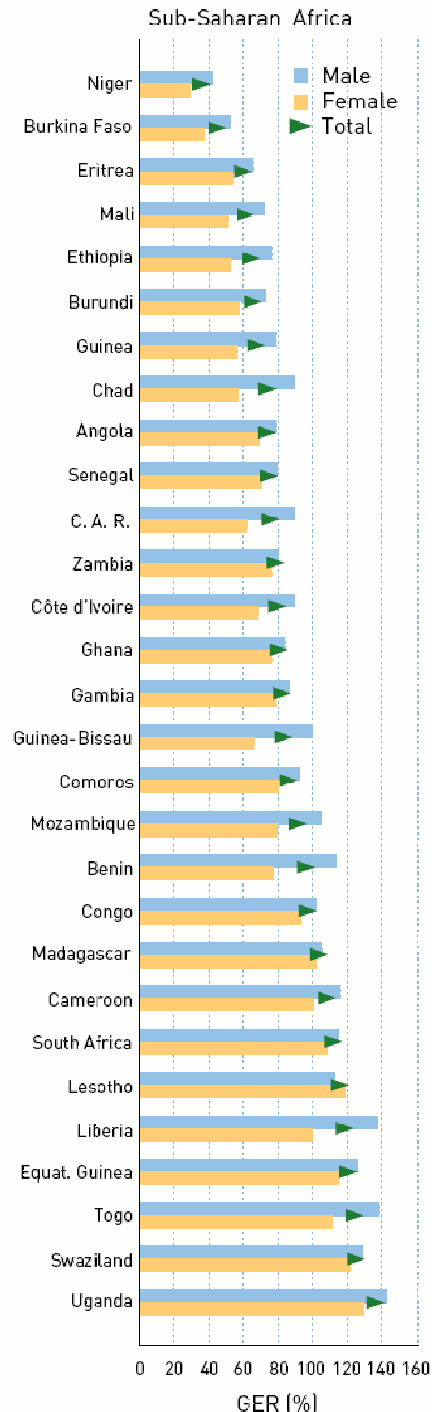
Primary education: gross enrolment ratio by gender

(not including countries with GPI between 0.97 and 1.03, i.e. very close to parity, in increasing order of total GER)

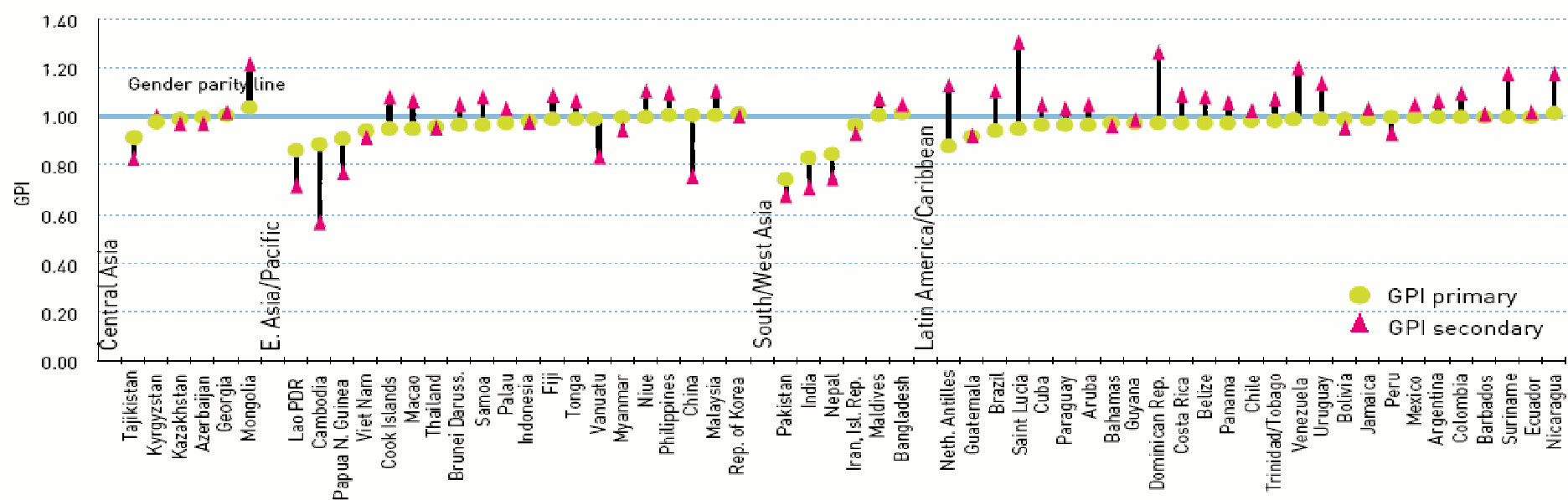
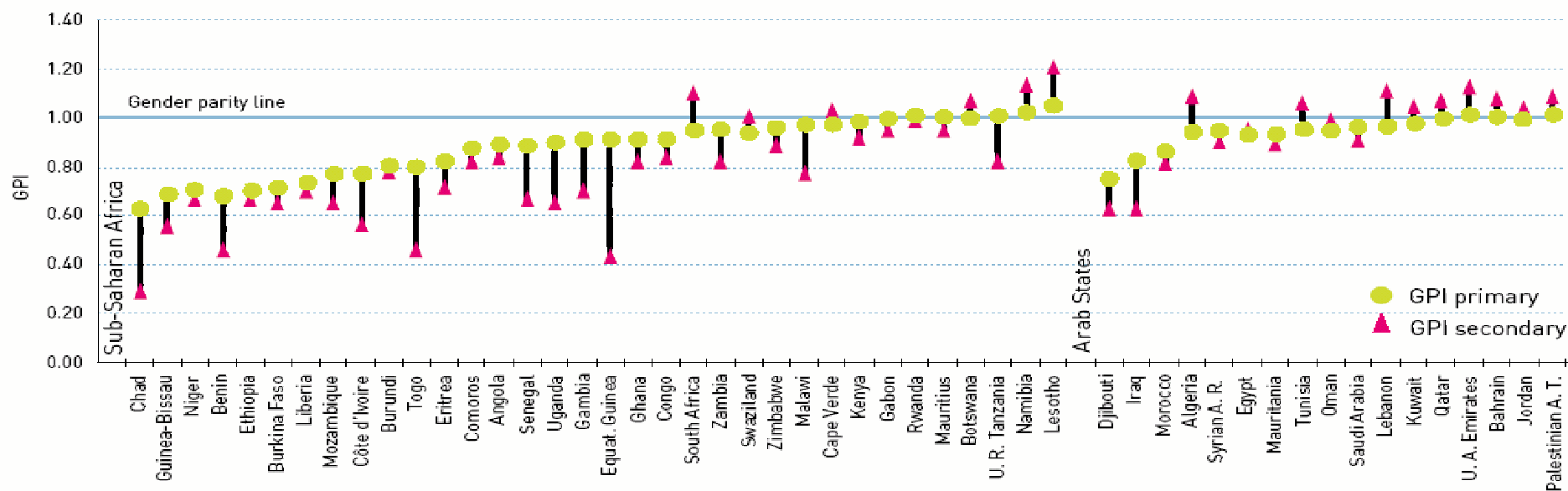
Gross enrolment ratio is the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school-year.

Education for All (EFA)

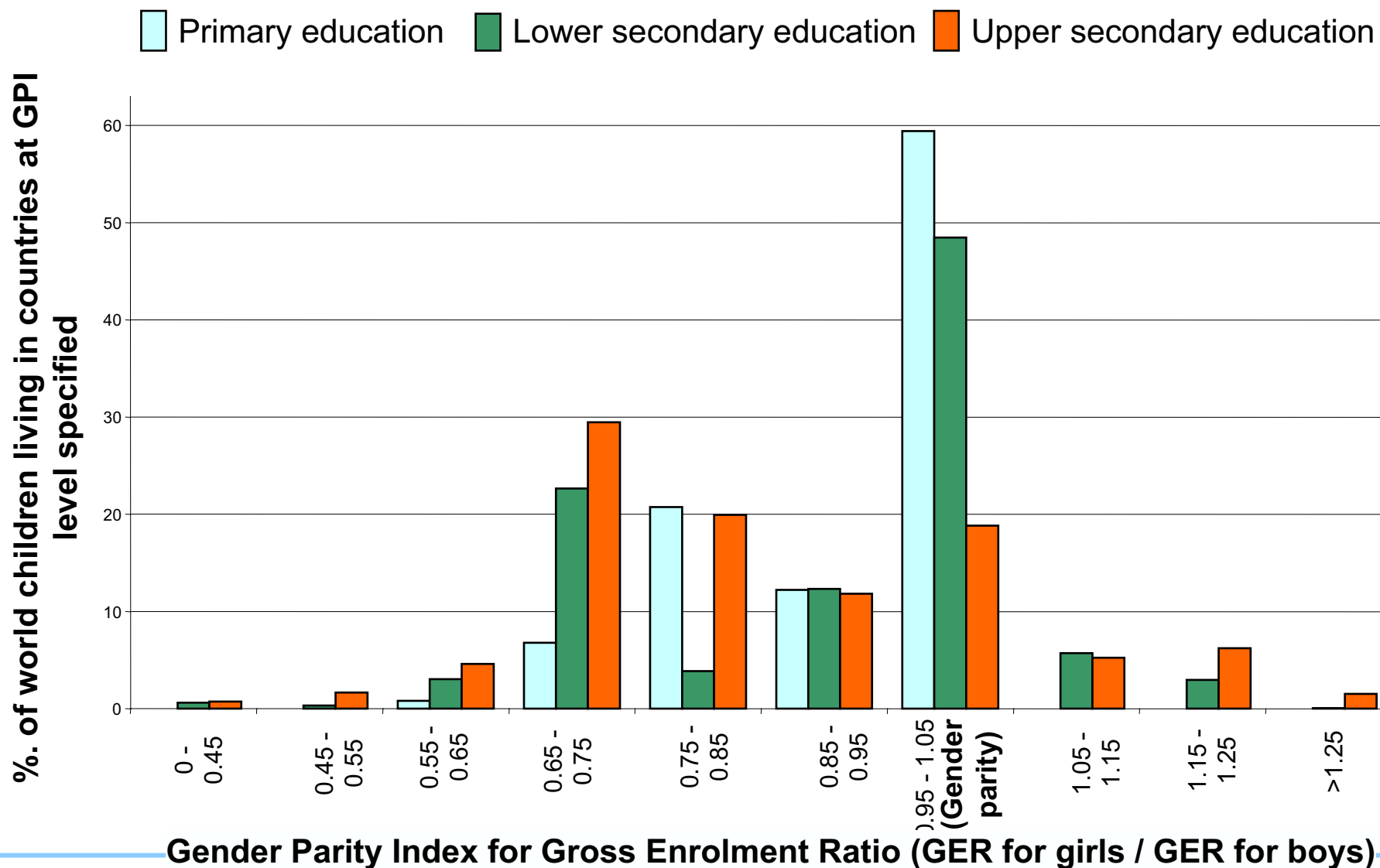
The international community is committed to eliminating gender disparities in primary and secondary schooling by 2005, and to achieving gender equality by 2015.

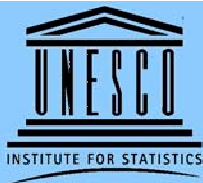


Gender parity indices for gross enrolment in primary and secondary education (2000)

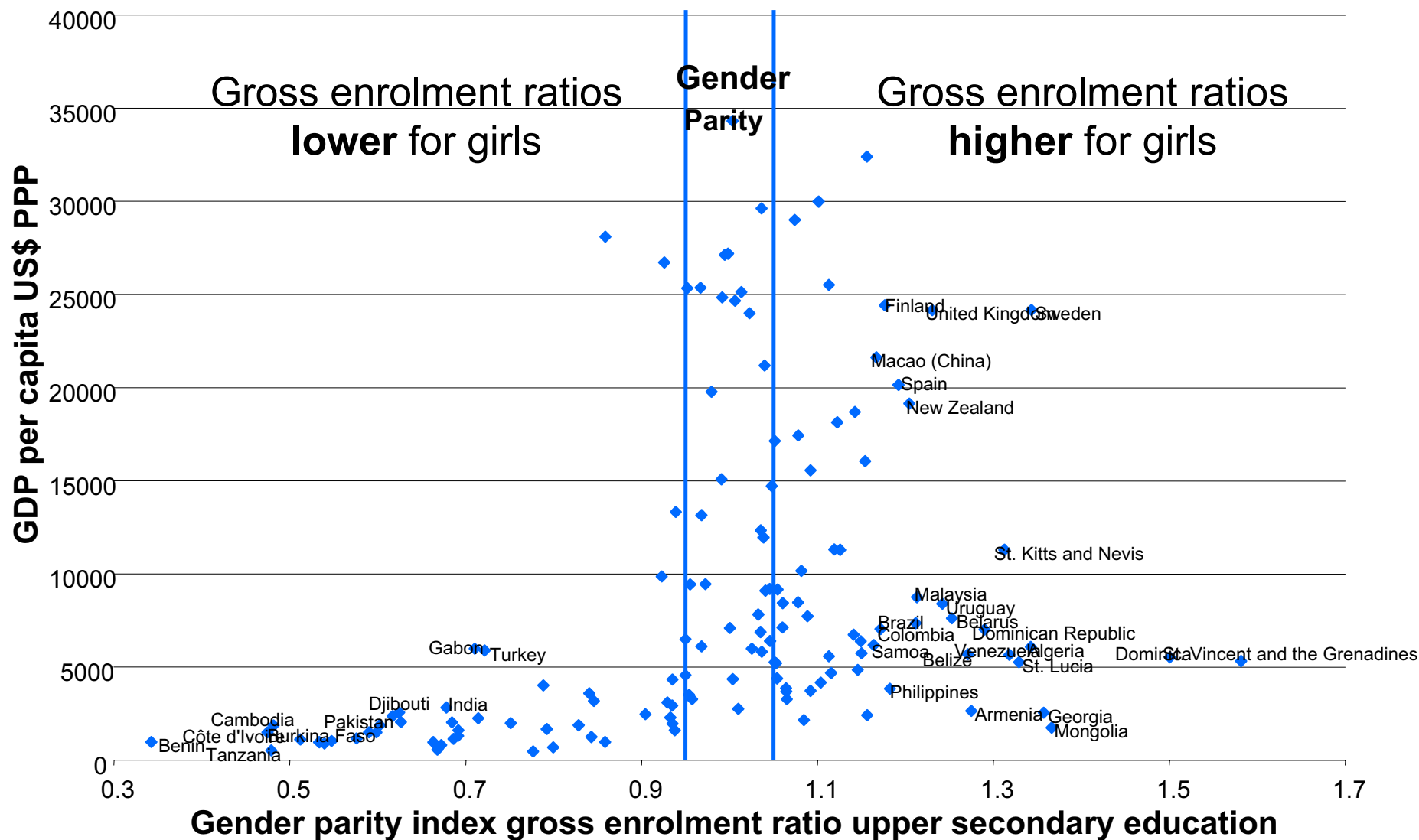


How many children live in countries where gender parity has not been reached?

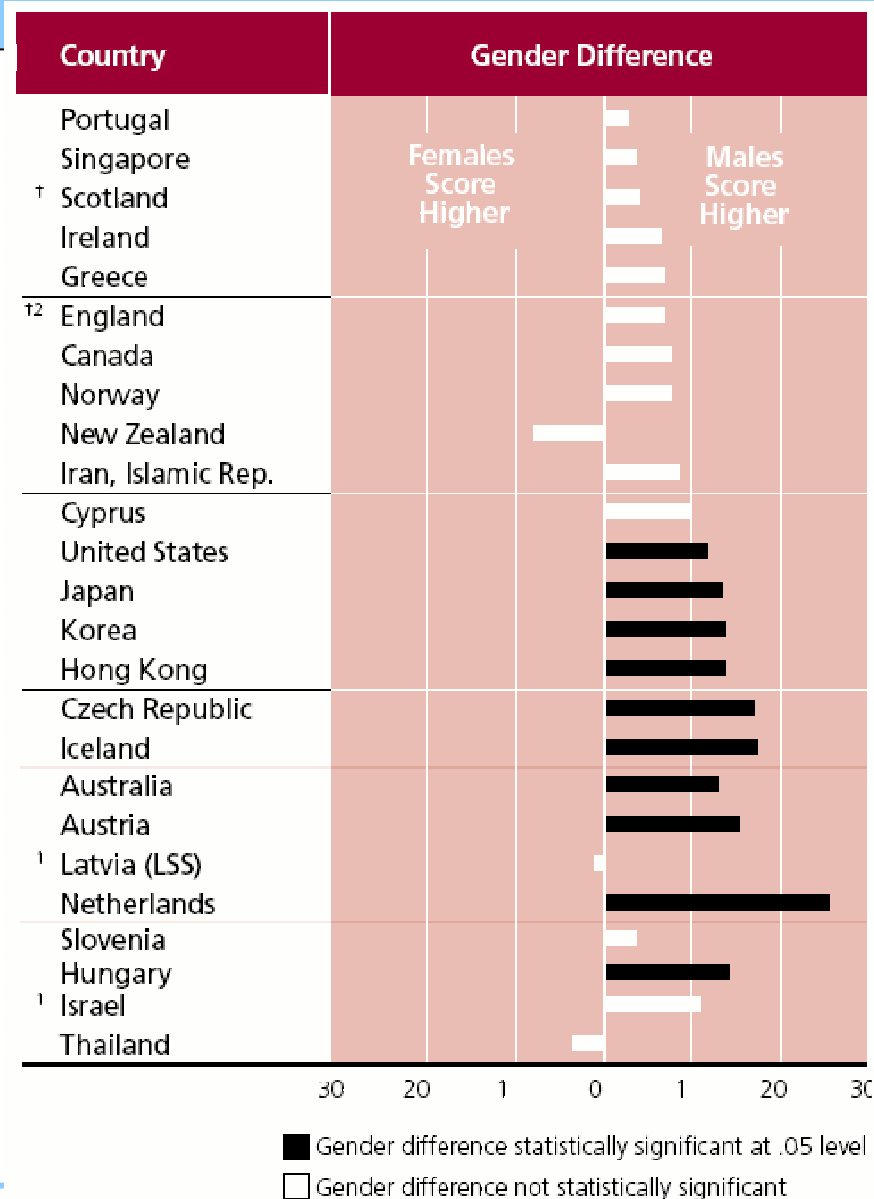




Upper secondary: How does gender inequity relate to national income?

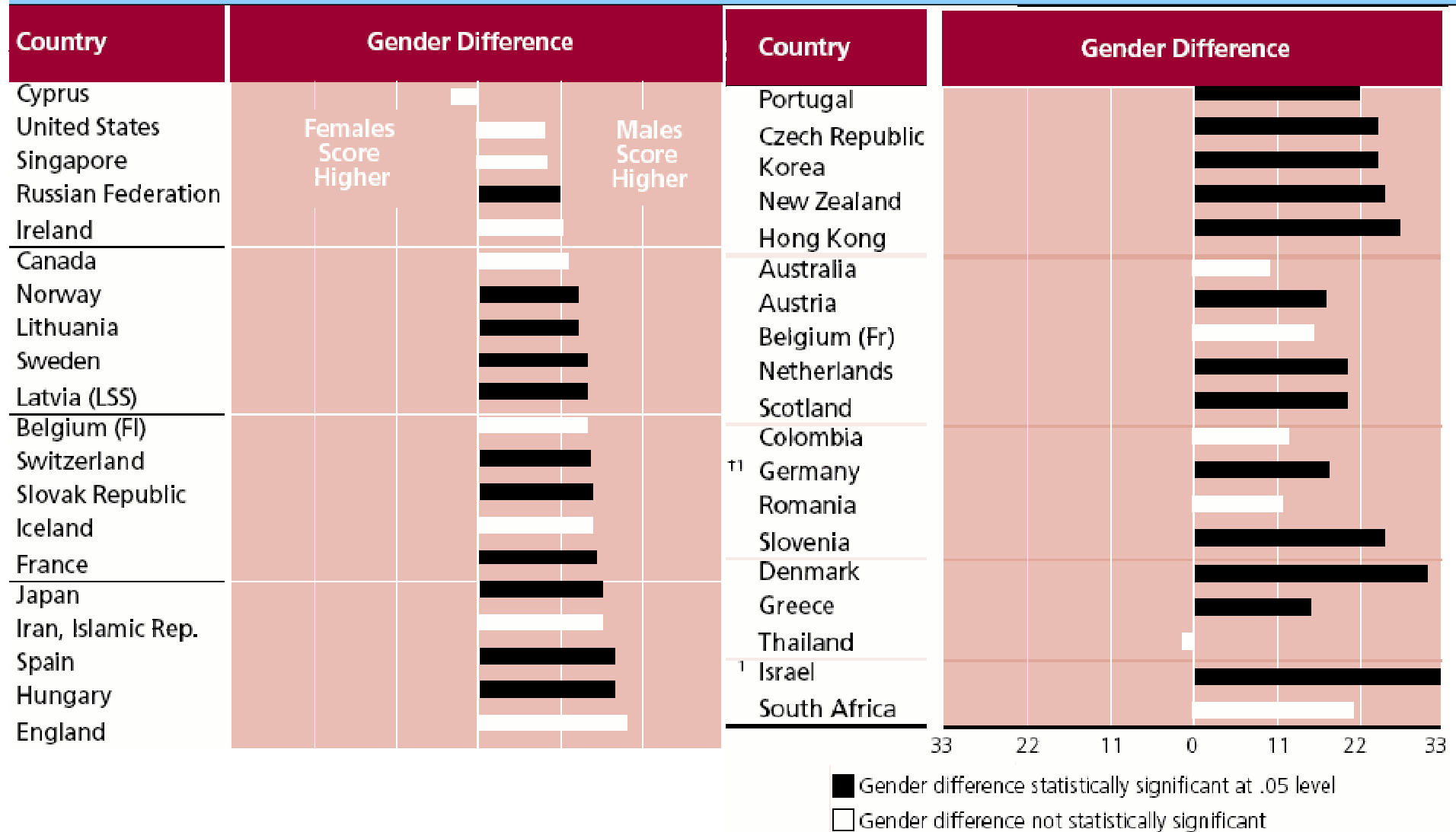


TIMSS: Gender Differences in Science Achievement - Fourth Grade

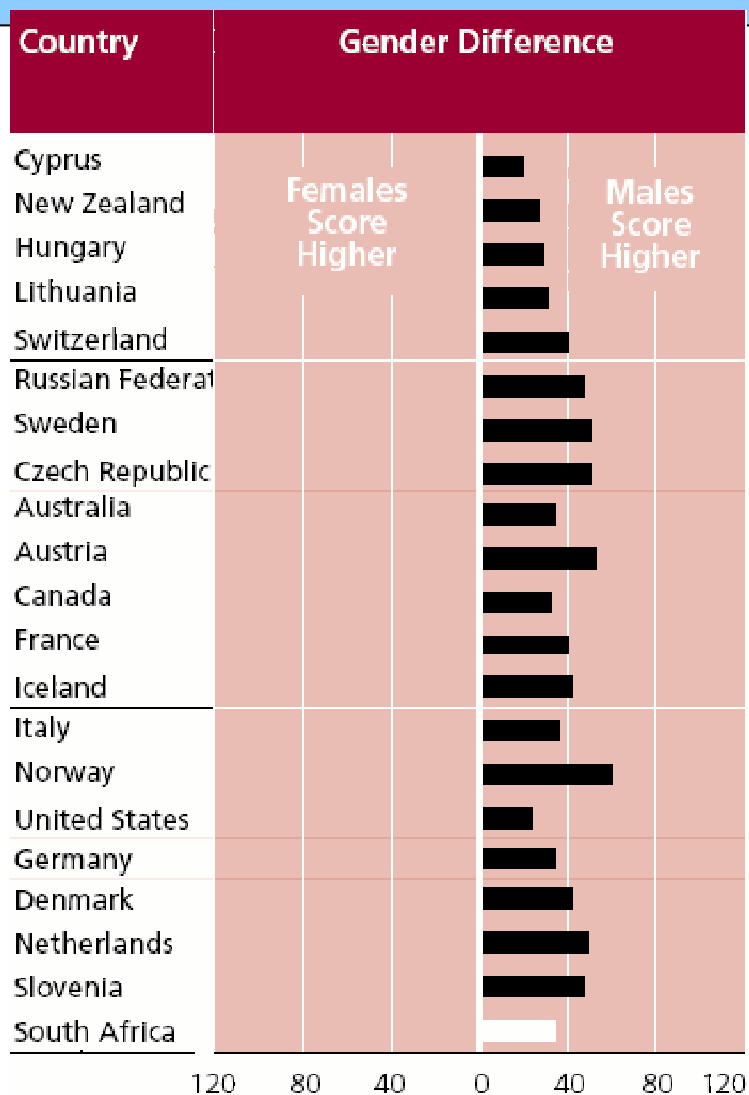




TIMSS: Gender Differences in Science Achievement - Eighth Grade



TIMSS: Gender Differences in Science Literacy - Final Year of Secondary School

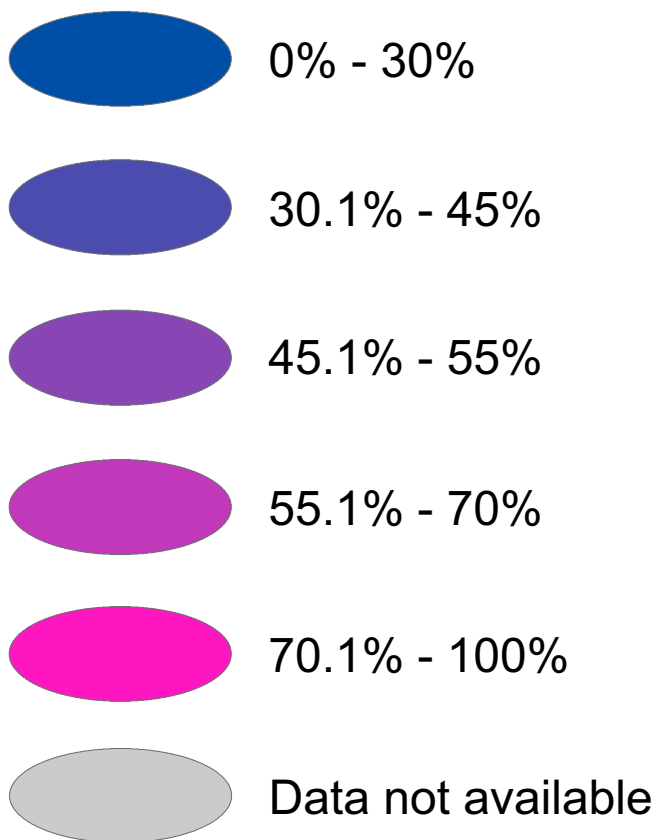


■ Gender difference statistically significant at .05 level

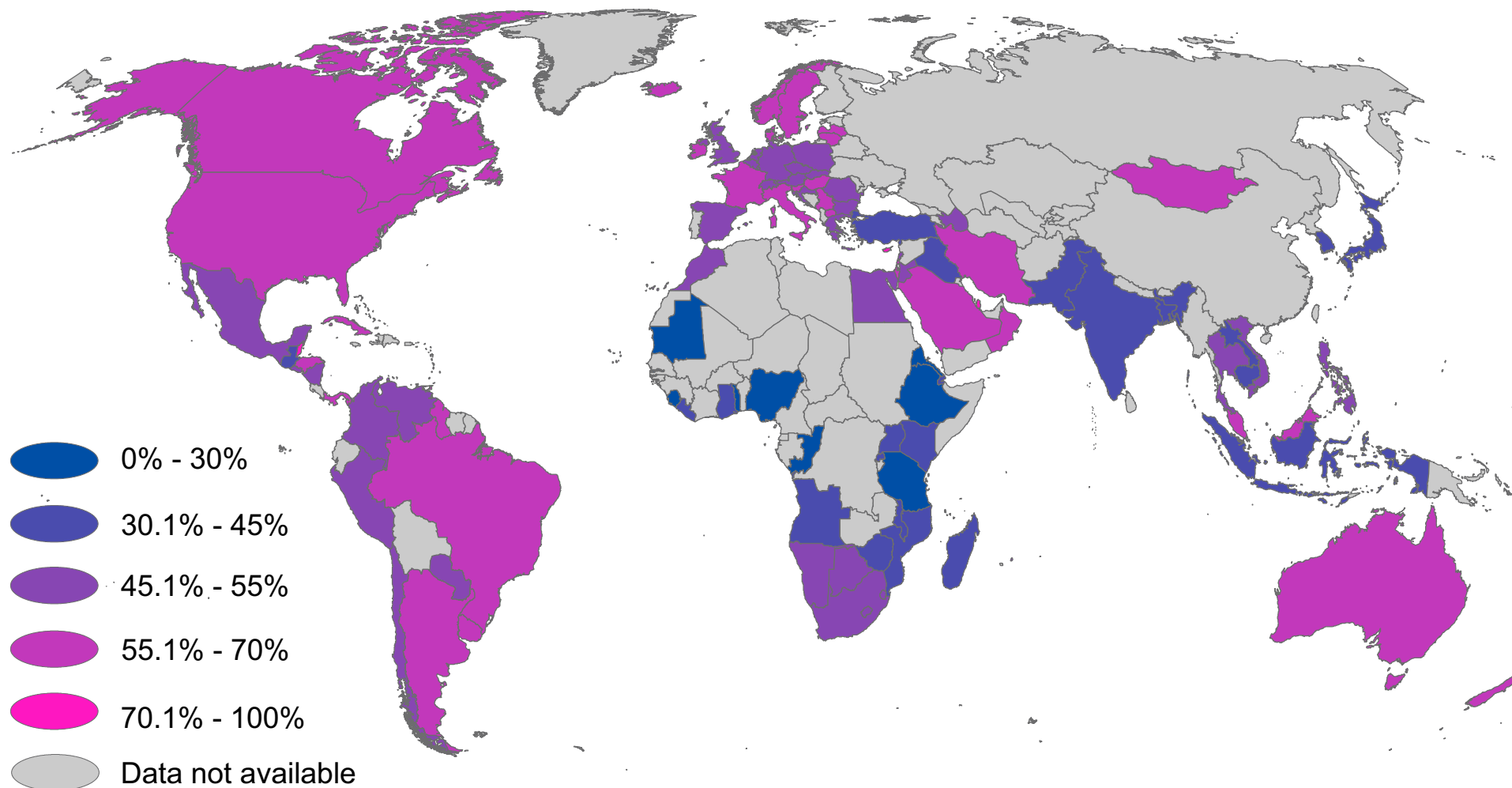
□ Gender difference not statistically significant

Female participation in enrolment, graduates and researchers, by level, 2004

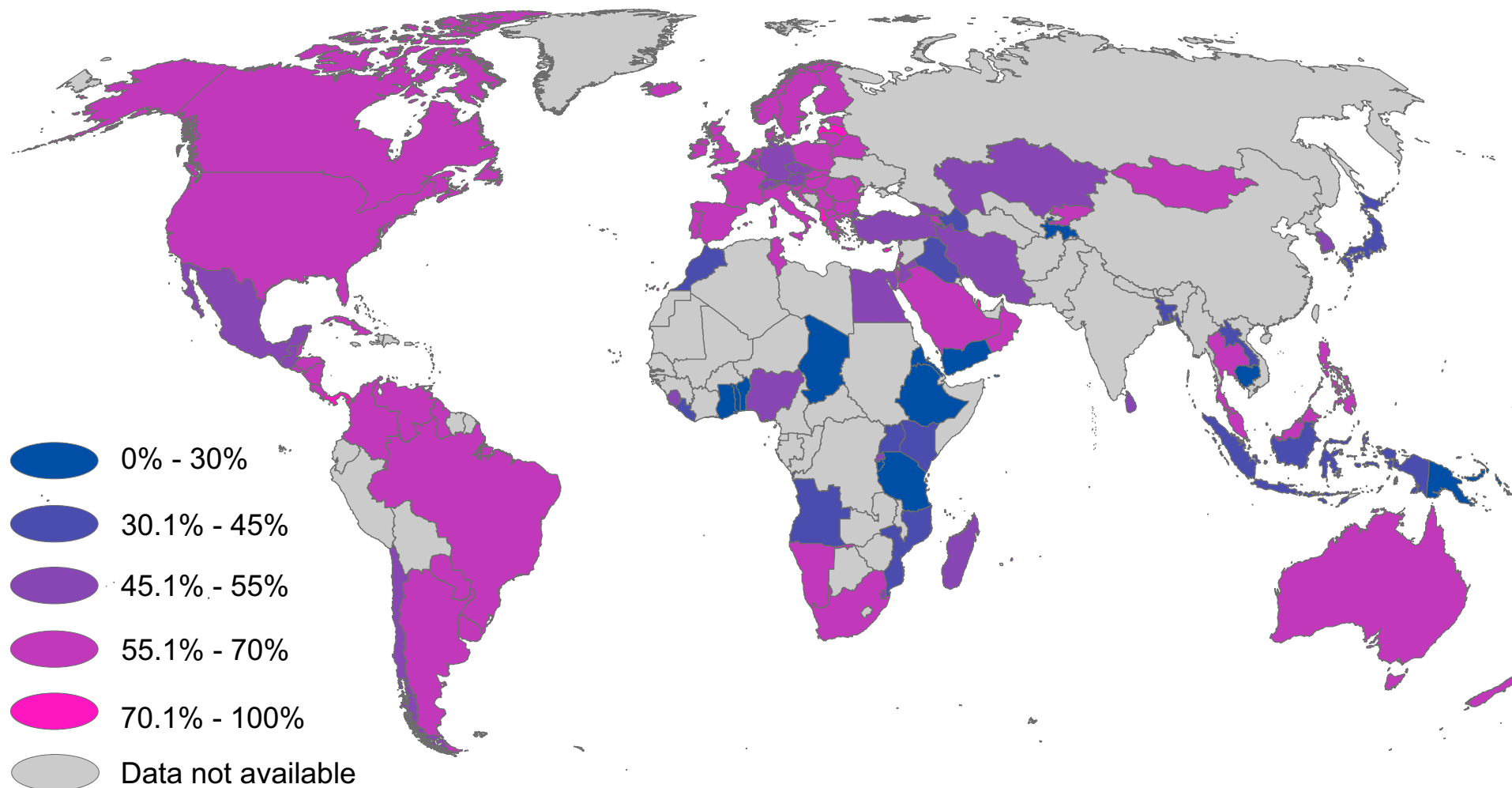
Percentage of female



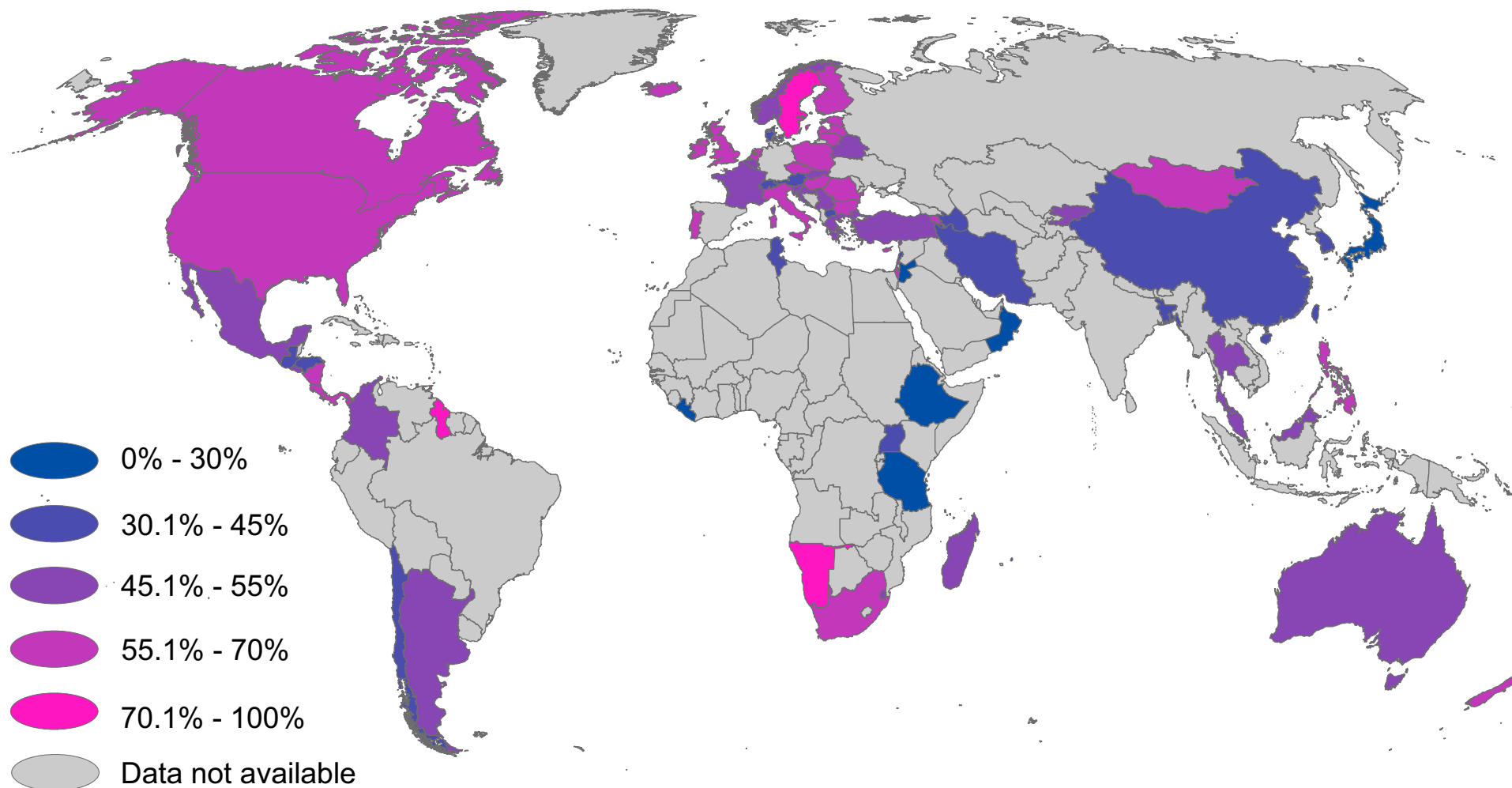
Percentage of Female Enrolment in ISCED 5A (1st Degree)



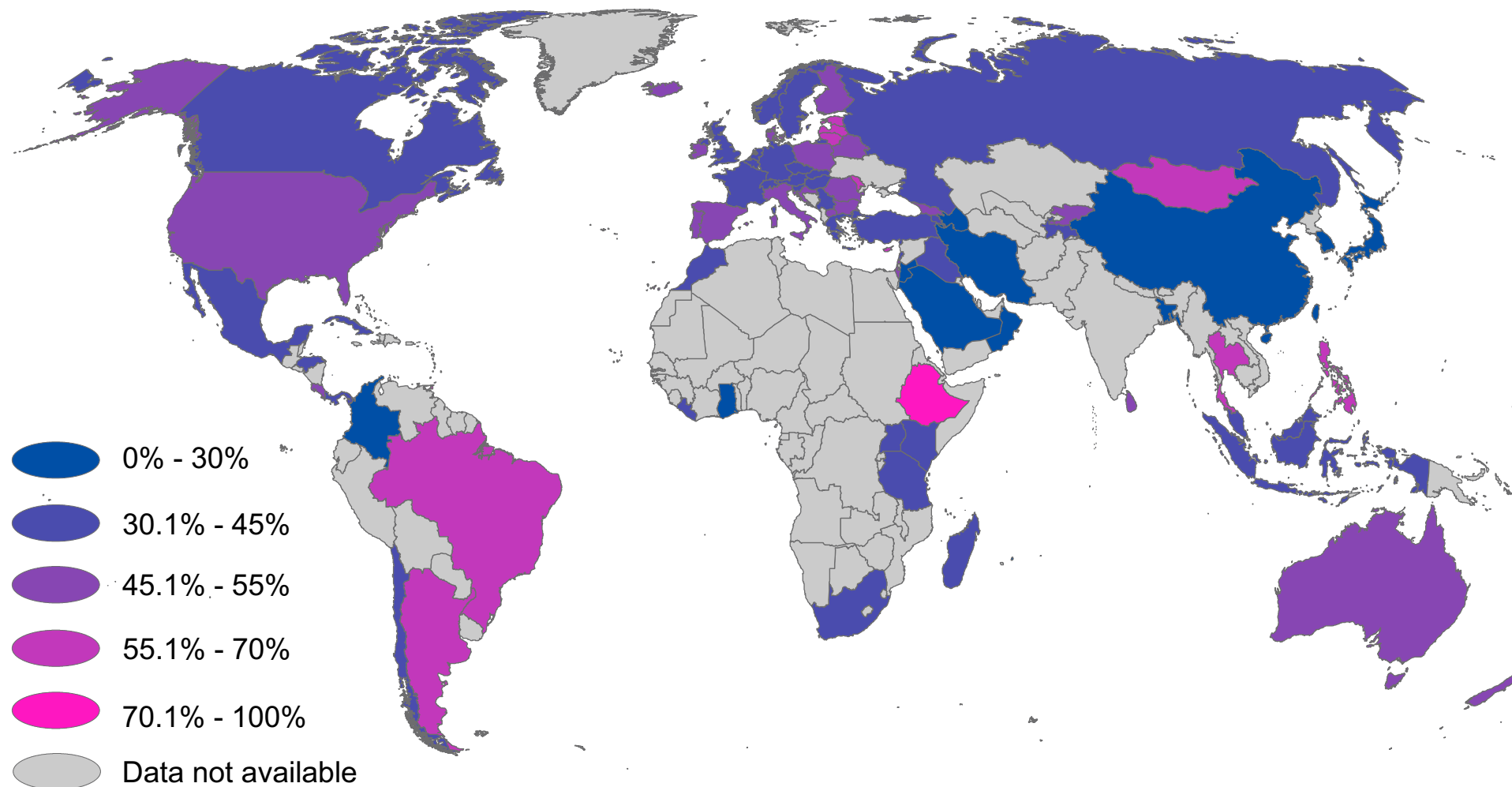
Percentage of Female ISCED 5A (1st Degree) Graduates



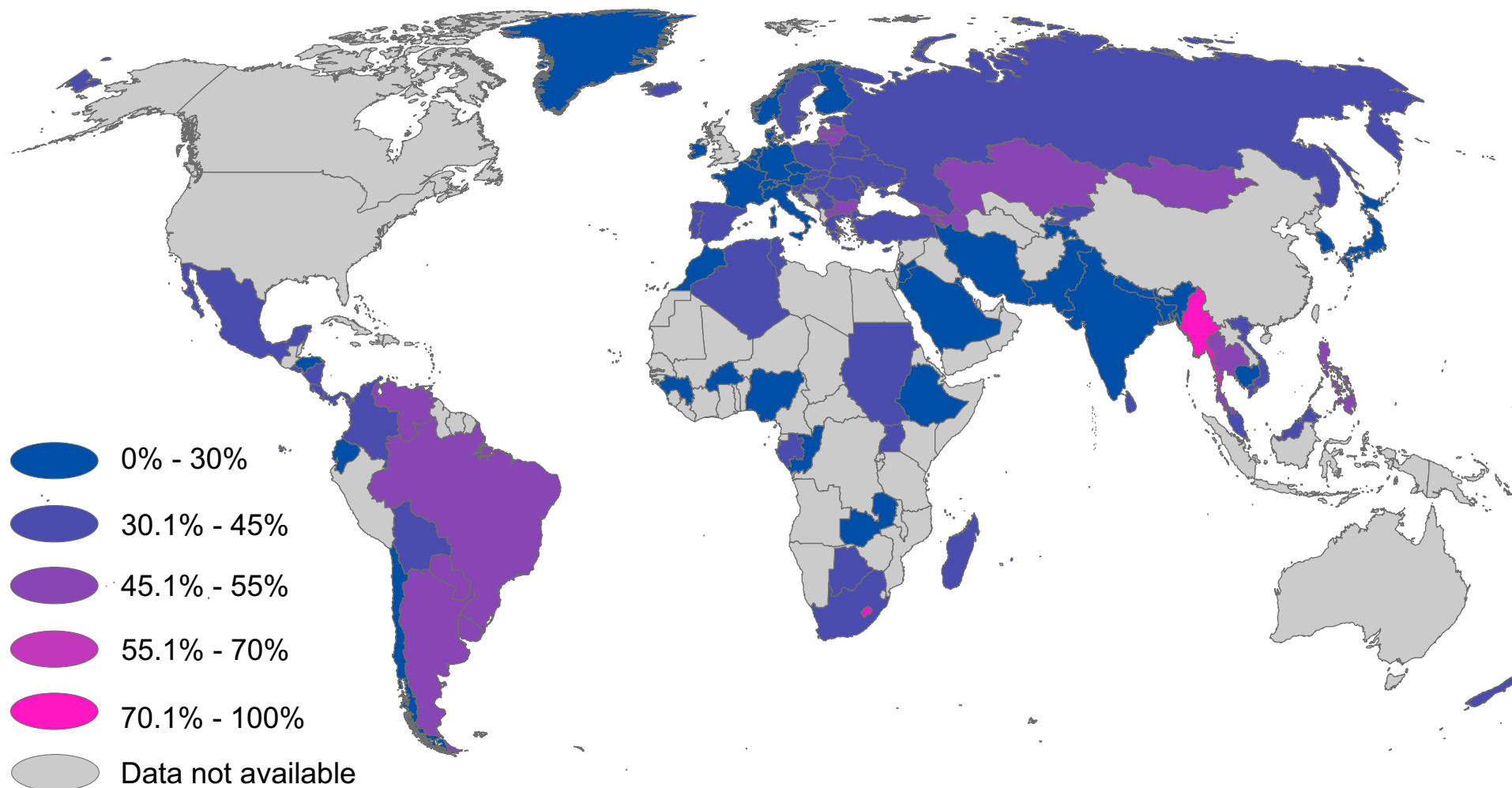
Percentage of Female ISCED 5A (2nd Degree) Graduates

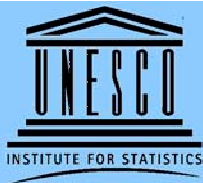


Percentage of Female ISCED 6 Graduates

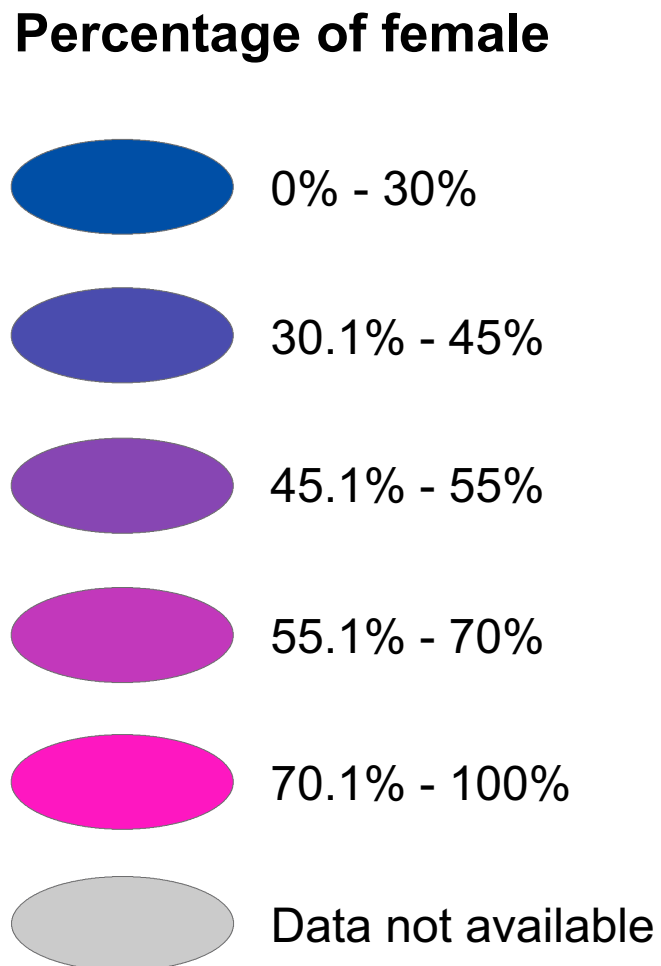


Percentage of Female Researchers

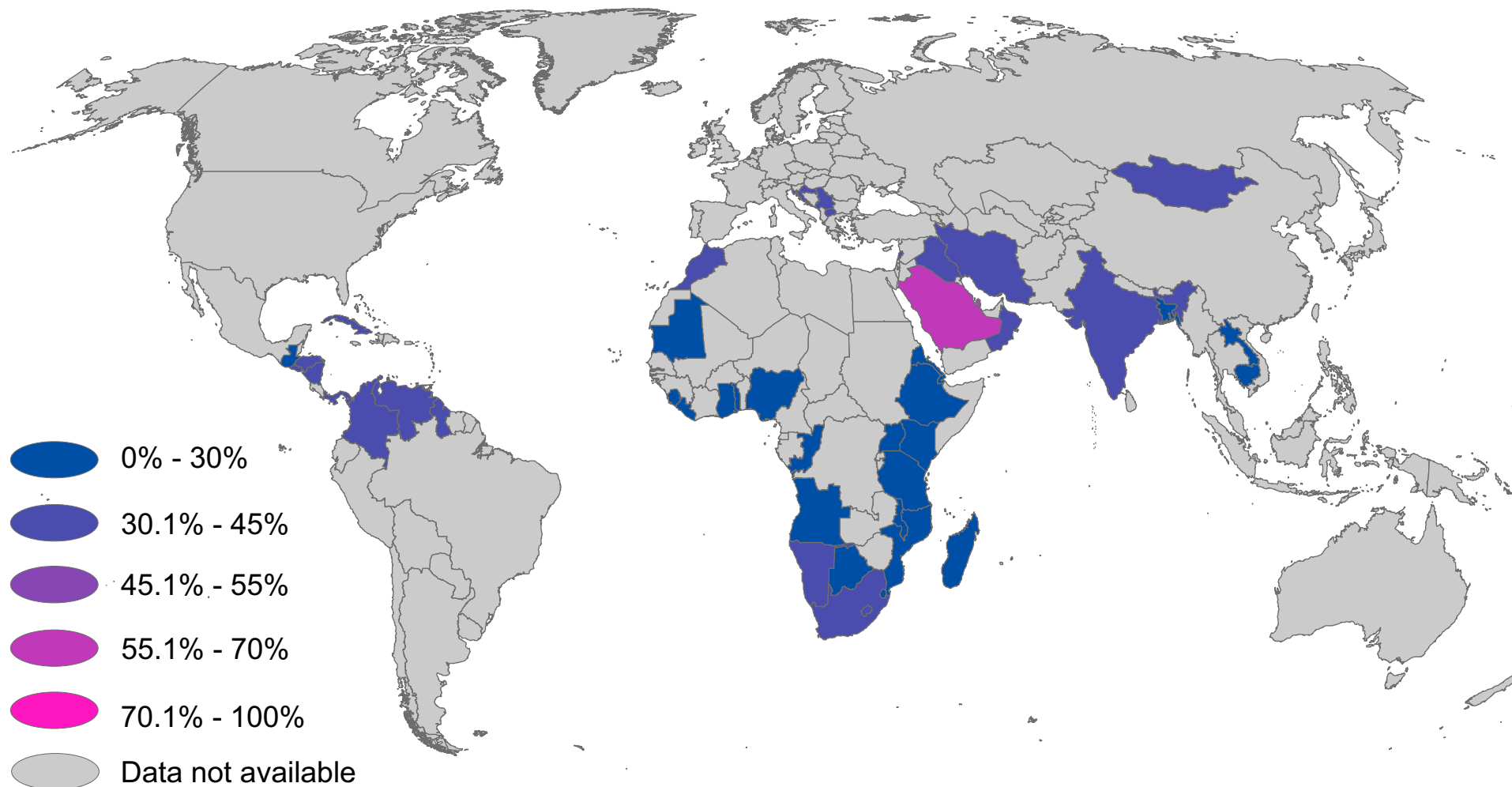




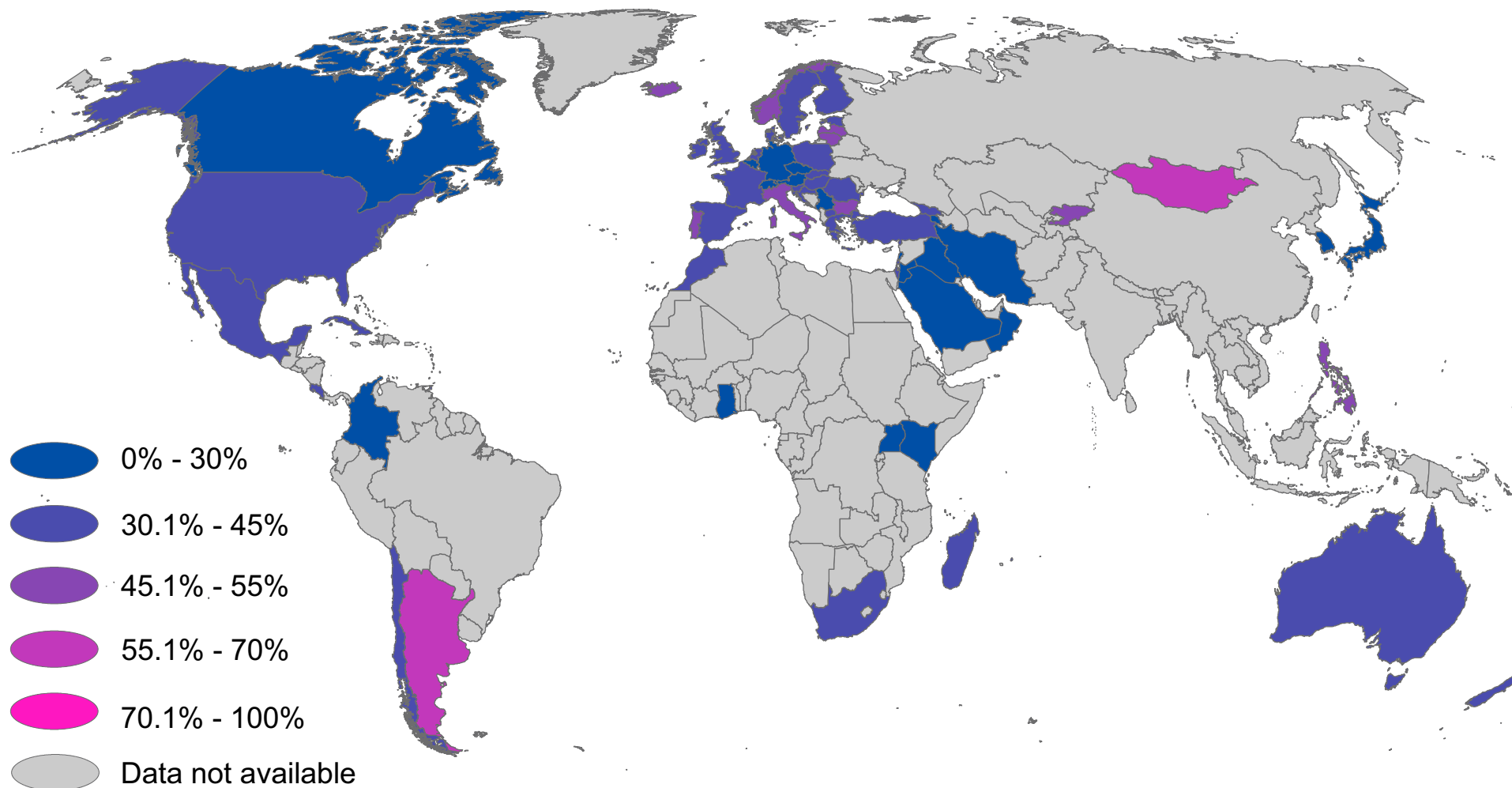
Female participation in enrolment and graduates **in S&E fields**, and researchers, by level, 2004



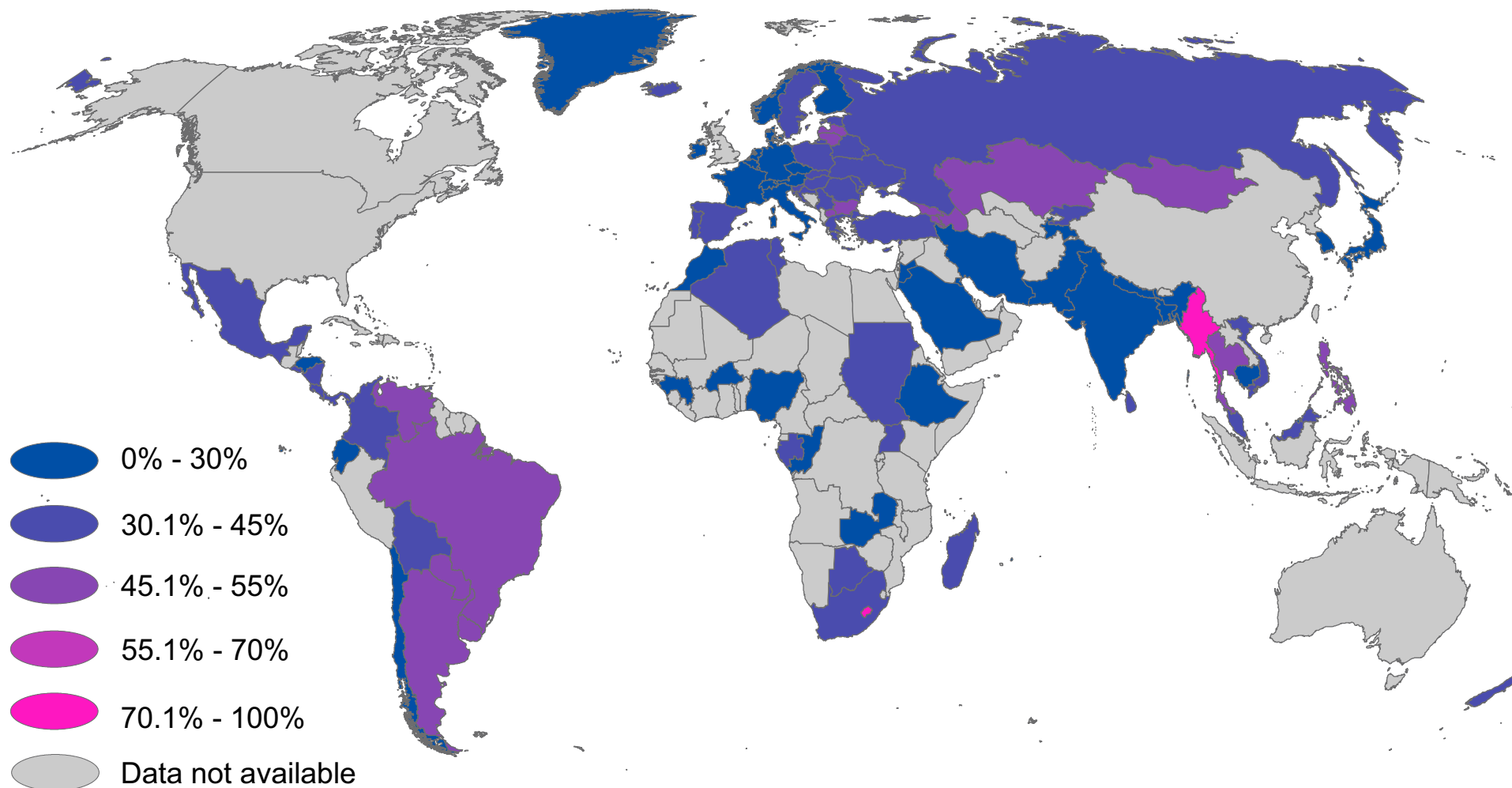
Percentage of Female **Enrolment in ISCED 5A (1st Degree): Science & Engineering Fields**



Percentage of Female **ISCED 6** Graduates: Science & Engineering Fields



Percentage of Female Researchers (all fields)

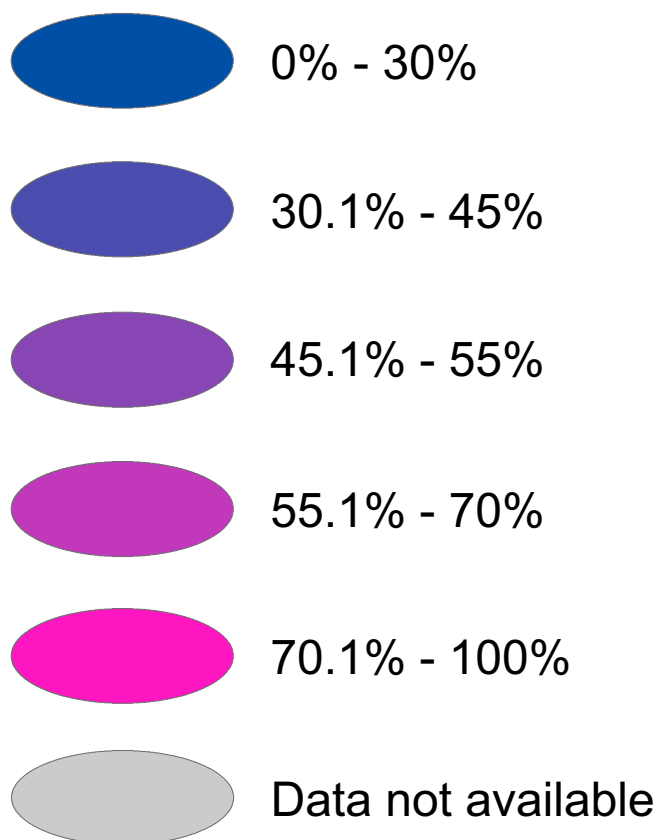


Female participation in enrolment, graduates and researchers, by level, 2004: SEE Countries

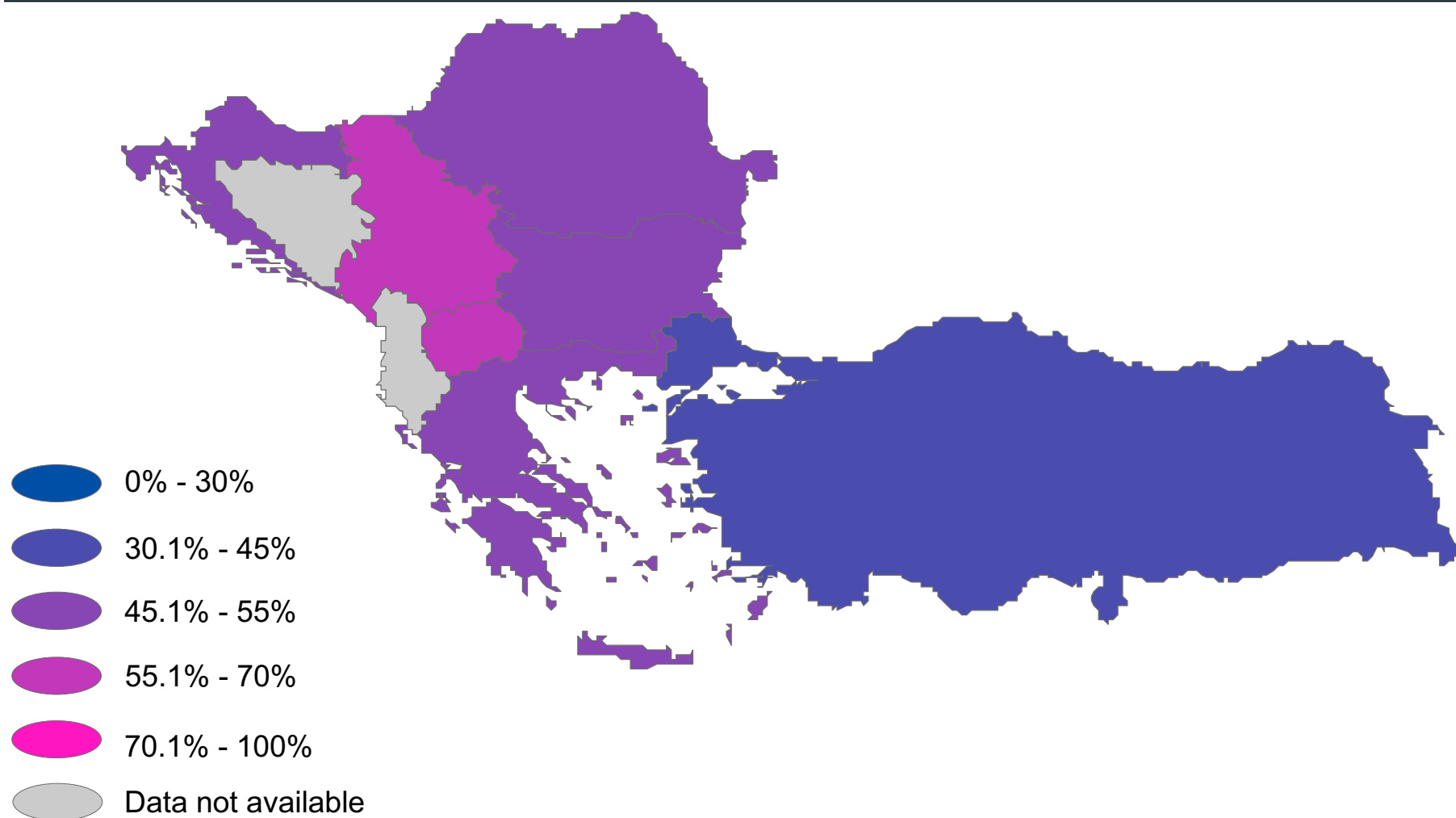
Country	Year	% of women in total enrolment by ISCED levels		% of women in total number of graduates by ISCED levels						% of women researchers
		5A 1 st degree (Total)	5A 1 st degree (S&E)	5A 1 st degree (Total)	5A 1 st degree (S&E)	5A 2 nd degree (Total)	5A 2 nd degree (S&E)	6 (Total)	6 (S&E)	
Albania	2003	72%	44%
Bulgaria	2004	52%	...	57%	41%	59%	45%	51%	48%	46%
Croatia	2002	55%	35%	59%	40%	50%*	42%	48%*	44%*	41% ⁺⁺
Romania	2004	55%	...	57%	40%	56%	41%	49%	32%	43%
Serbia & Montenegro	2001	56%	36%	59%	42%	50%	42%	37% ⁺	26% ⁺	44% ⁺⁺
Macedonia (FYR)	2004	58%	41%	65%	47%	40%	42%	48%	38%	50%
Turkey	2004	43%	...	46%	34%	47%	40%	38%	36%	36%

Female participation in enrolment, graduates and researchers, by level, 2004, SEE countries

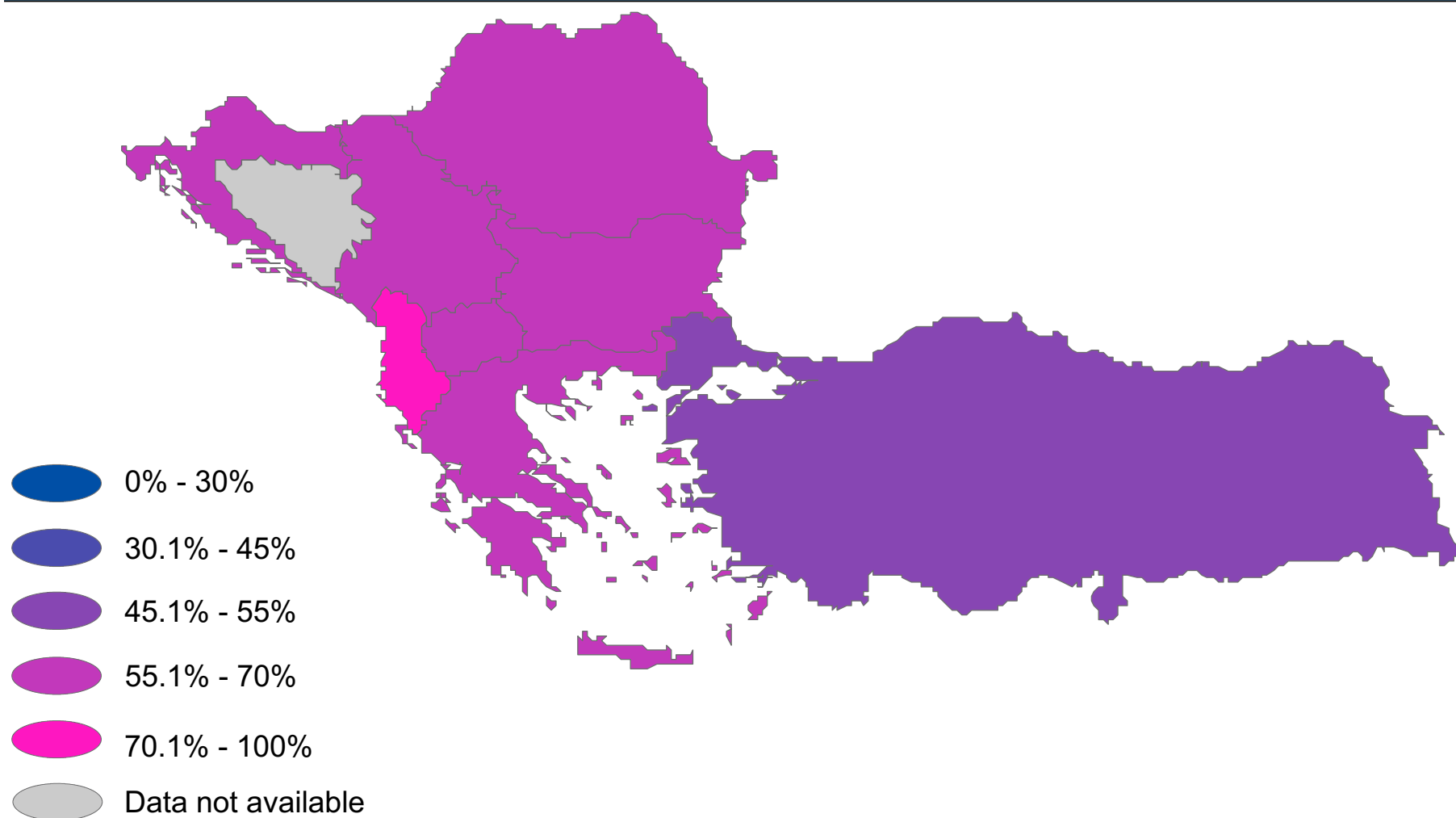
Percentage of female



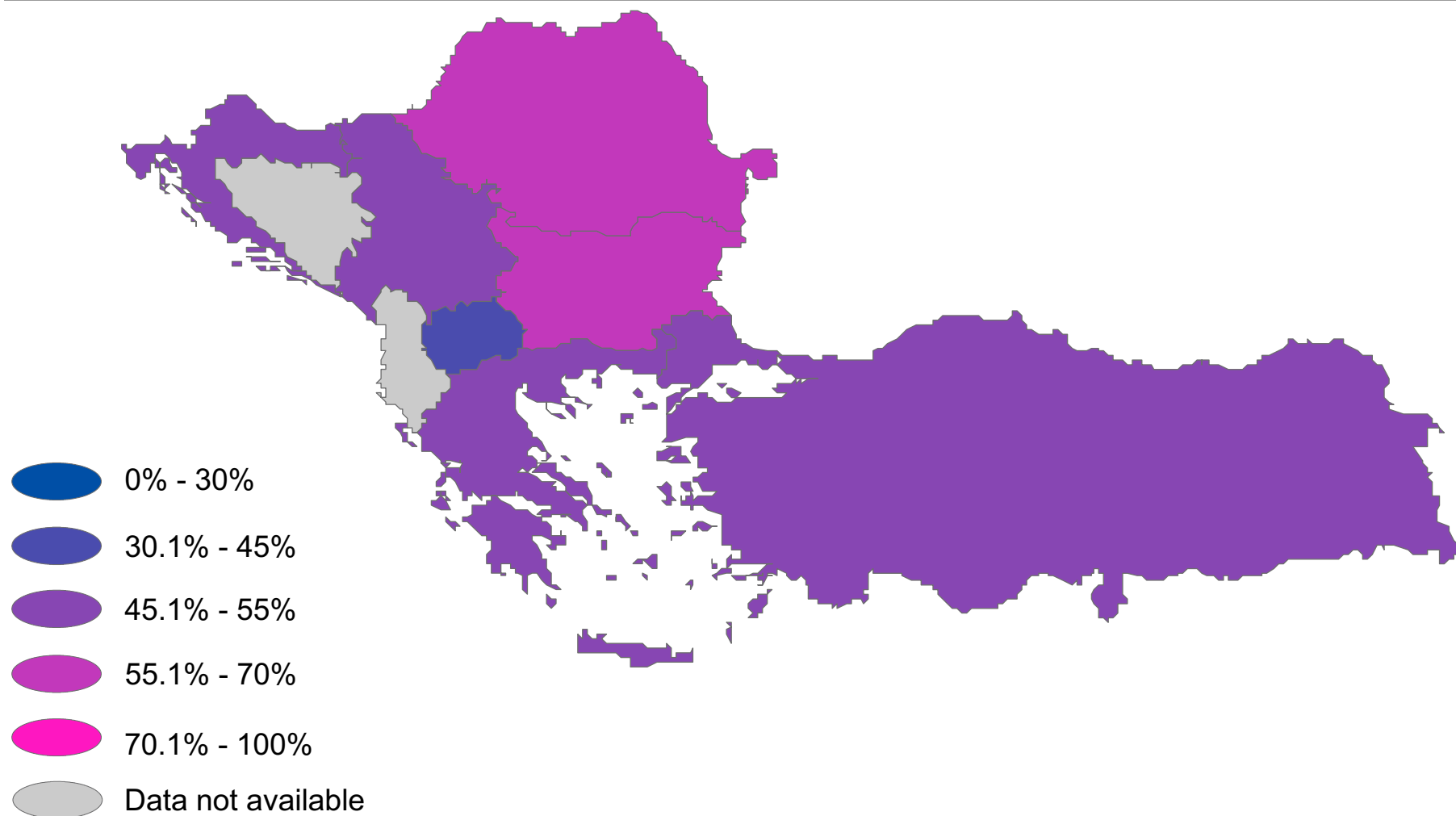
Percentage of Female Enrolment in ISCED 5A (1st Degree), SEE countries



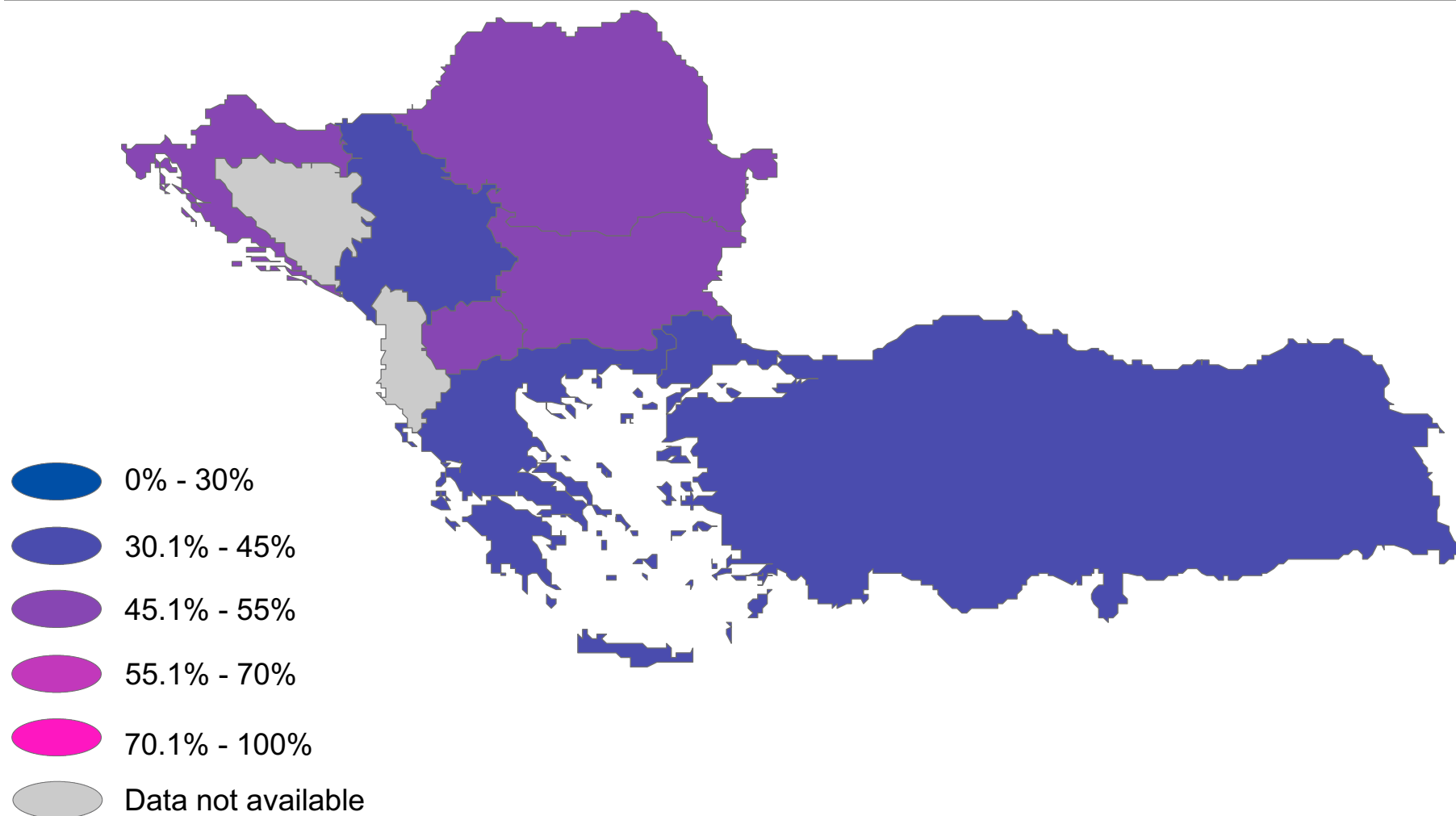
Percentage of Female ISCED 5A (1st Degree) Graduates, SEE countries



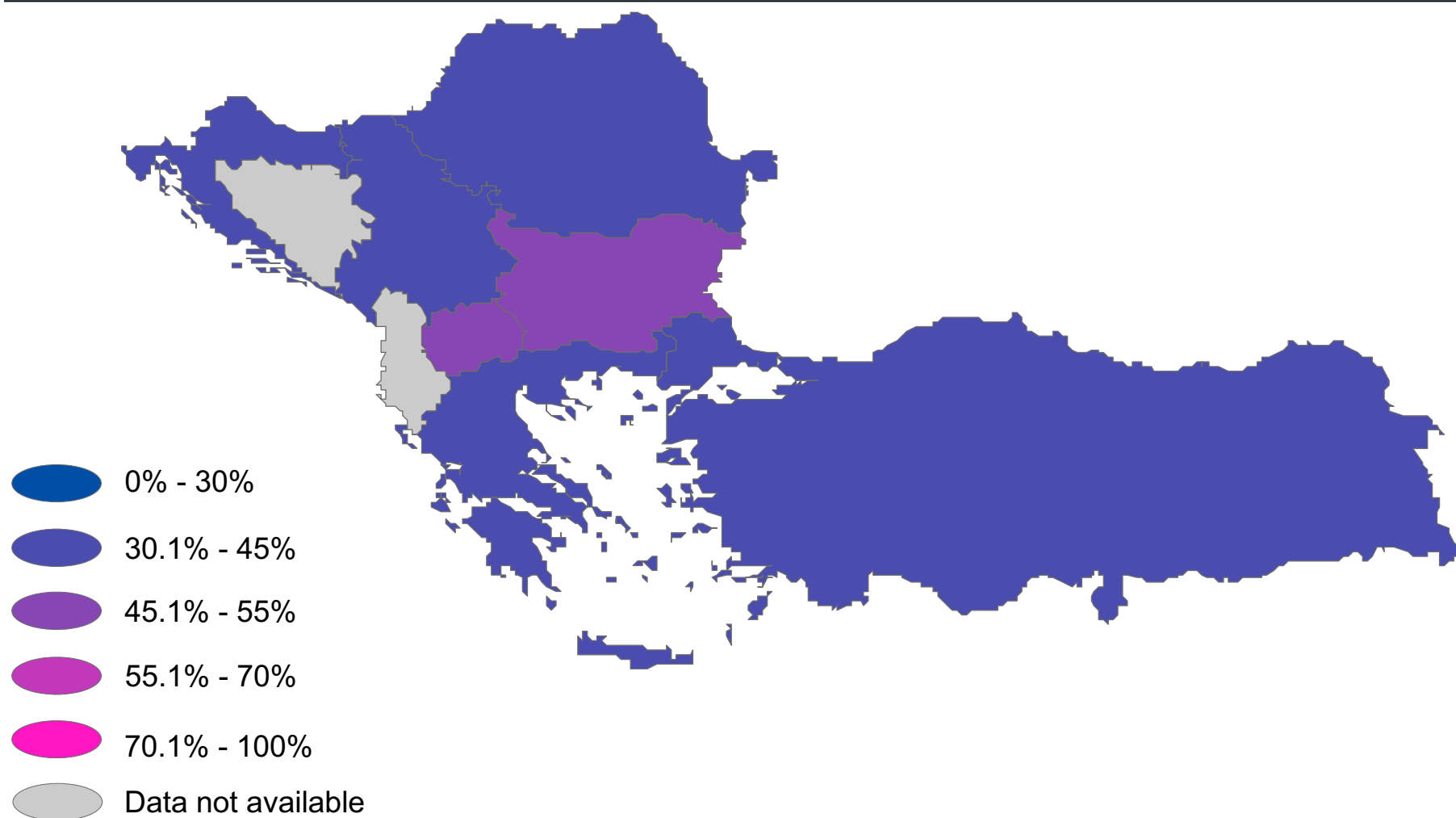
Percentage of Female ISCED 5A (2nd Degree) Graduates, SEE countries



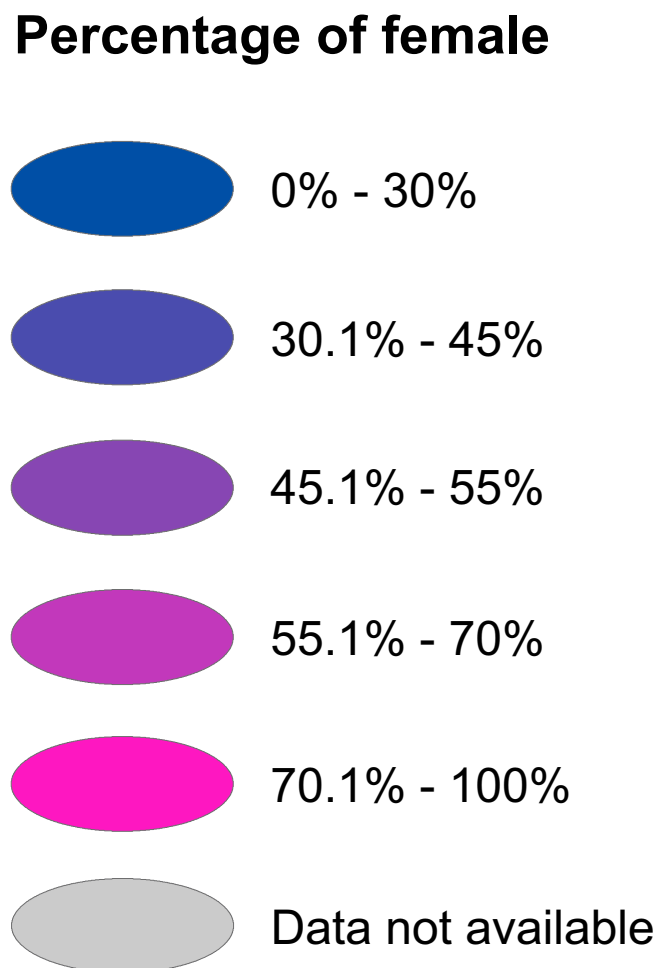
Percentage of Female ISCED 6 Graduates, SEE countries



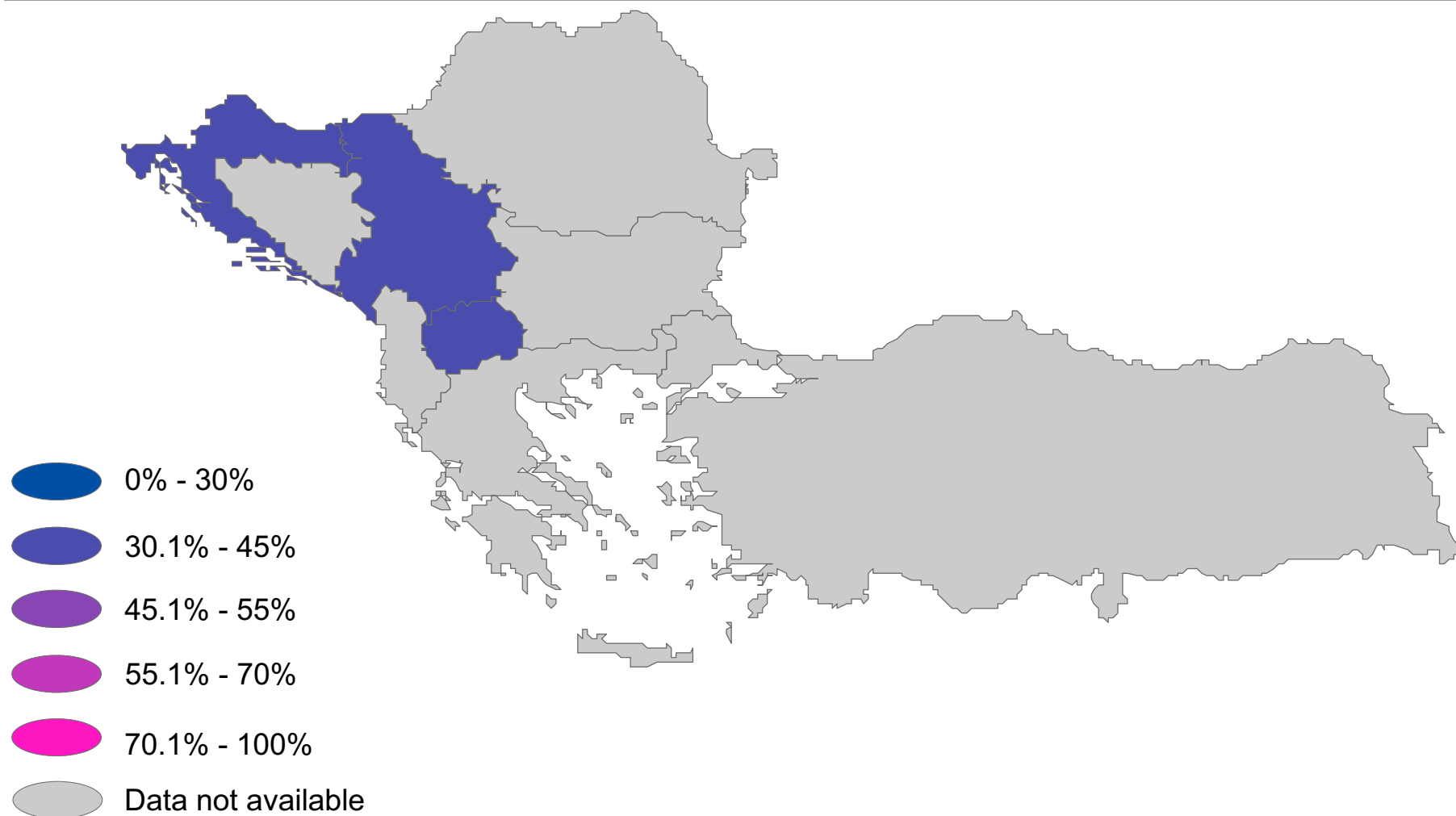
Percentage of Female Researchers, SEE countries



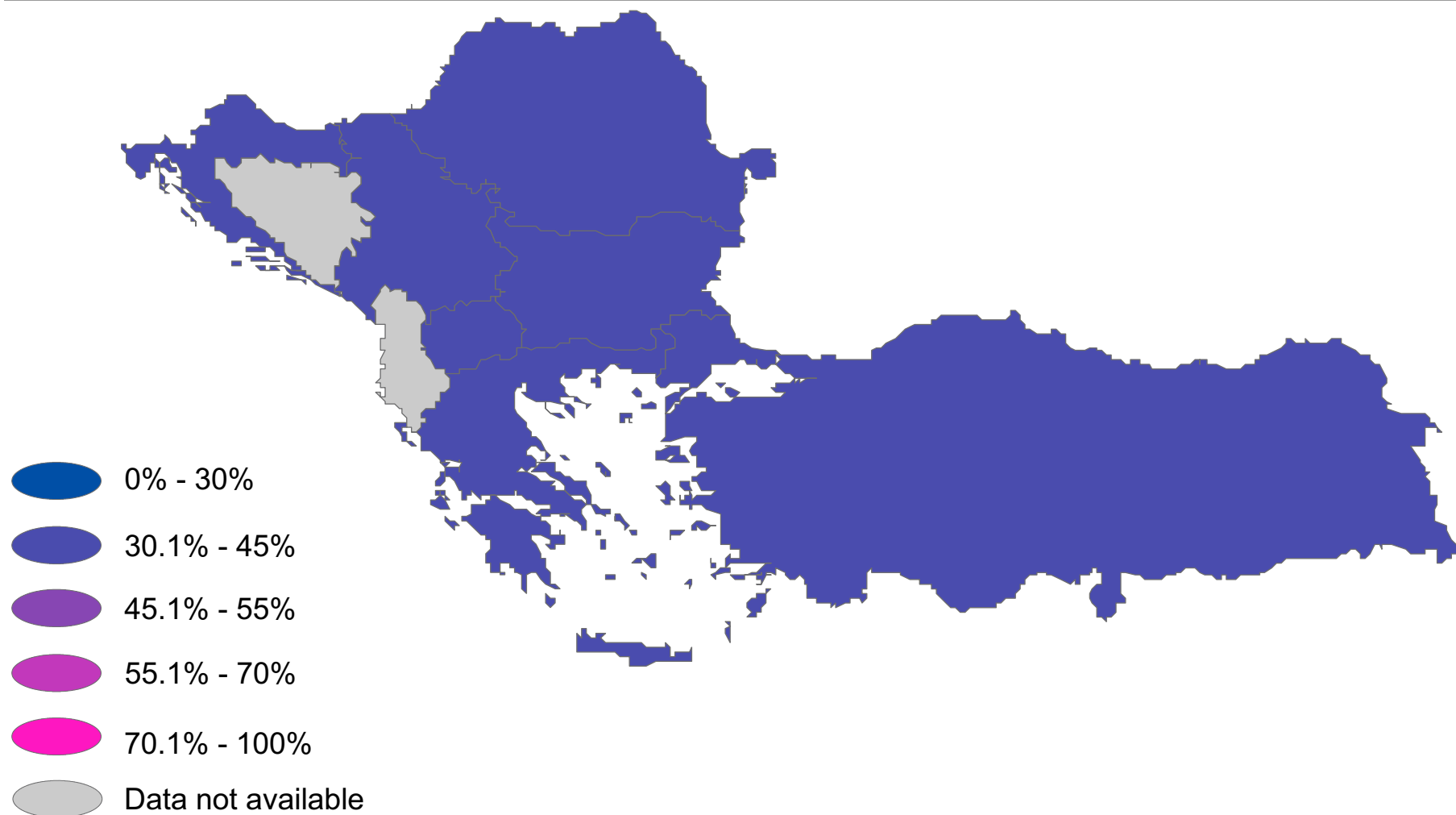
Female participation in enrolment and graduates in S&E fields, and researchers, by level, 2004, SEE countries



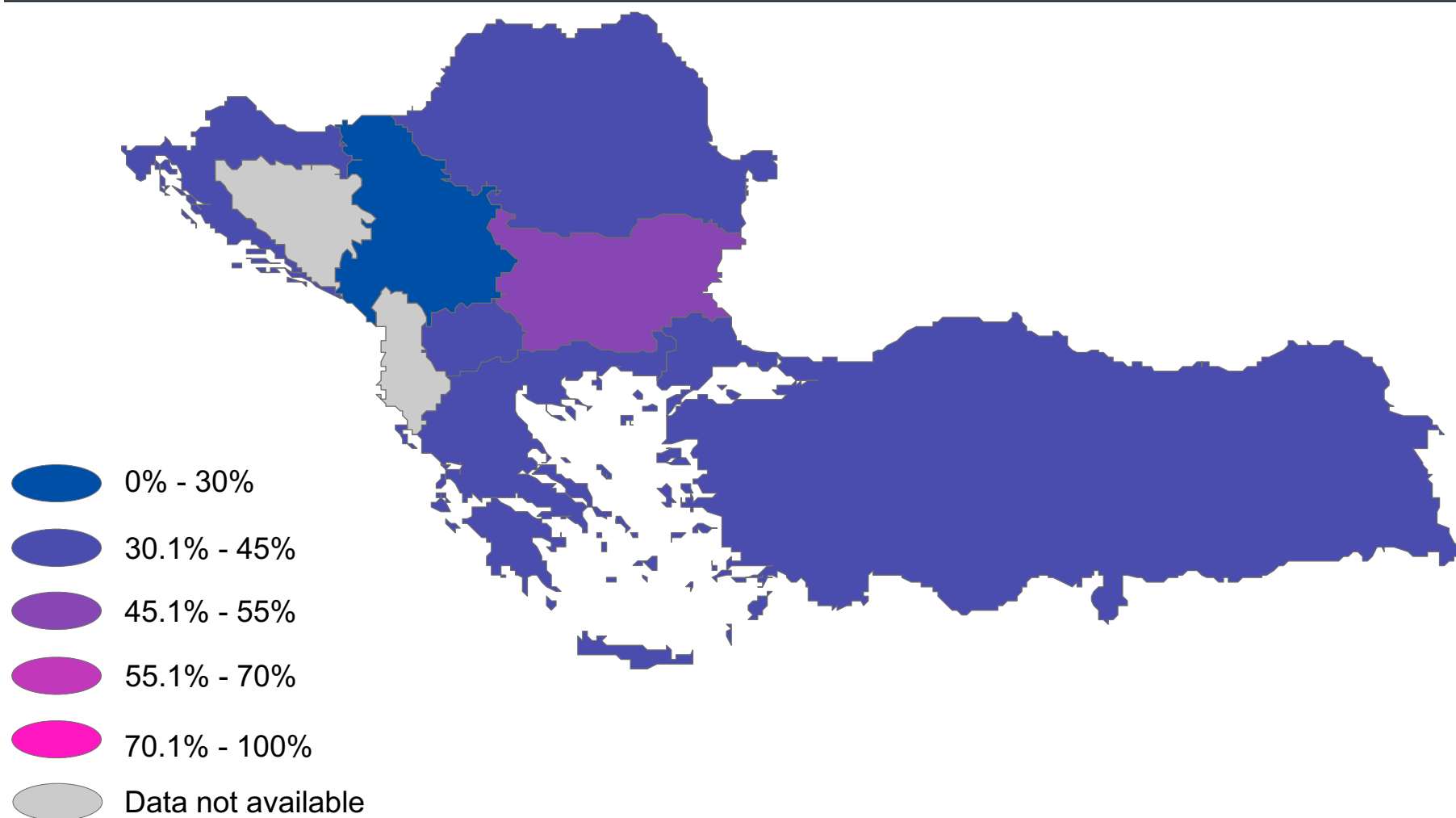
Percentage of Female **Enrolment in ISCED 5A (1st Degree):** Science & Engineering Fields, SEE countries

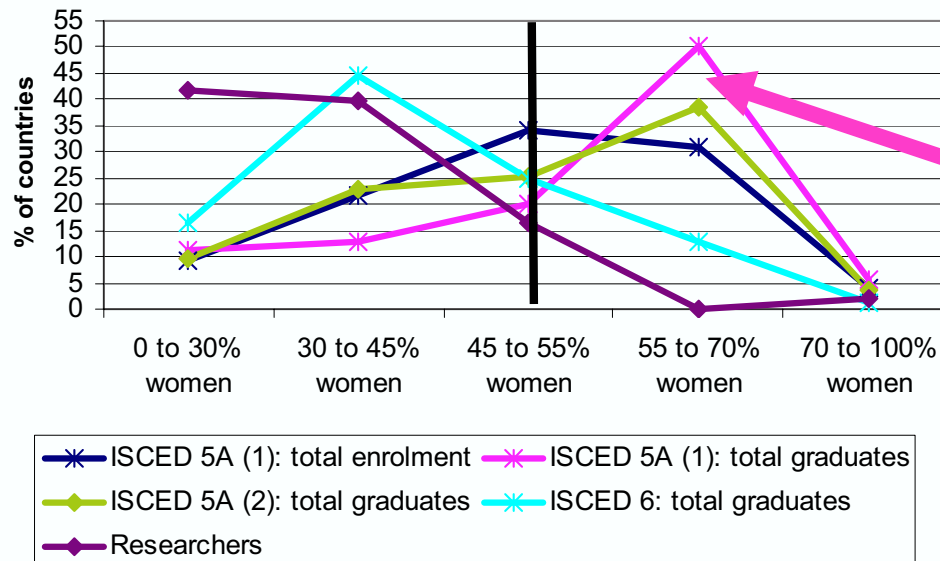


Percentage of Female **ISCED 5A (2nd Degree)** Graduates: Science & Engineering Fields, SEE countries



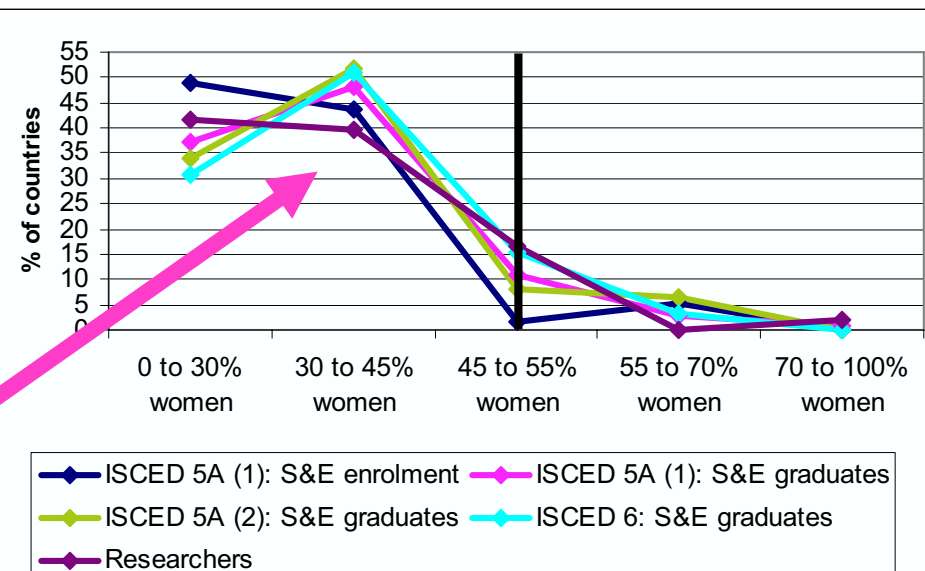
Percentage of Female **ISCED 6** Graduates: Science & Engineering Fields, SEE countries

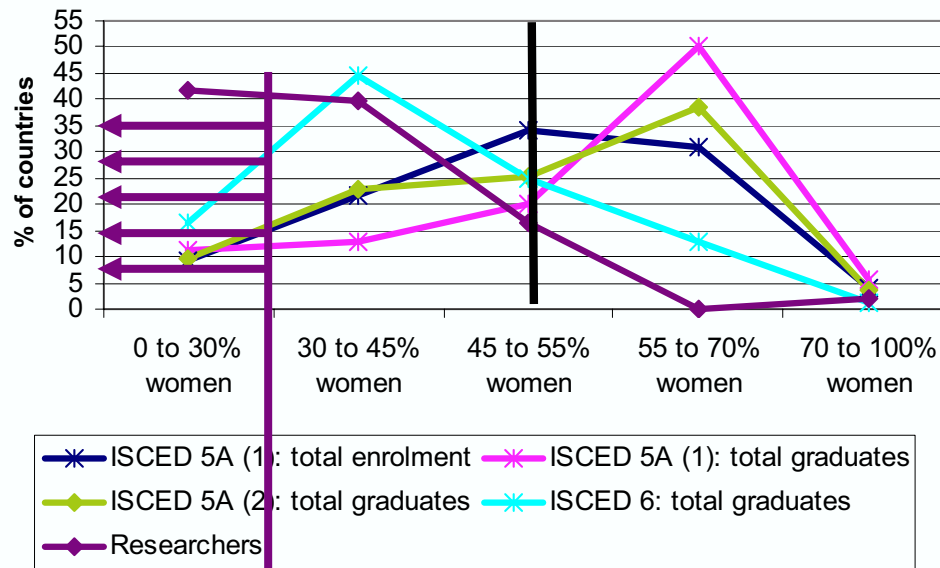




In more than **half** of the World's countries, women represent **more than 55% of the total university graduates** (first degree).

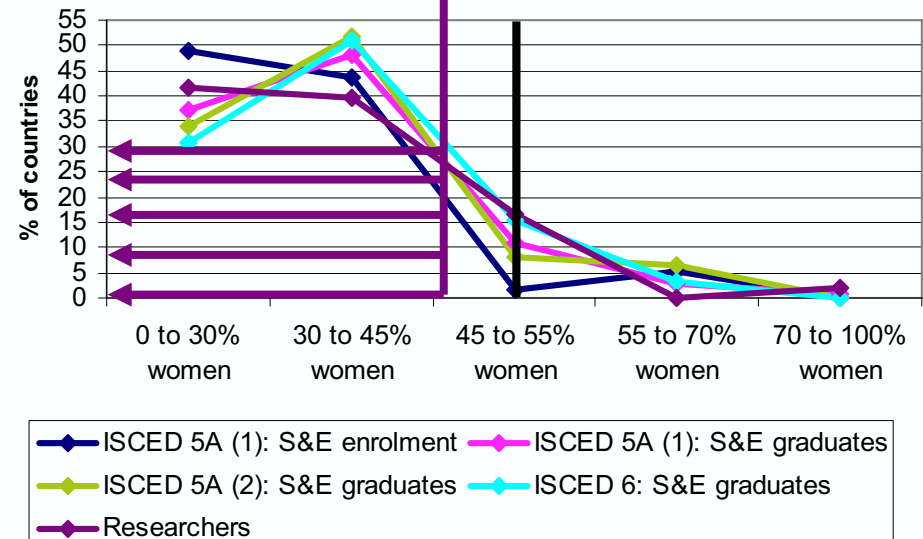
In more than **85%** of the World's countries, women represent **less than 45% of the university graduates in S&E fields**.





In more than **40%** of the World's countries, women represent **less than 30% of Researchers.**

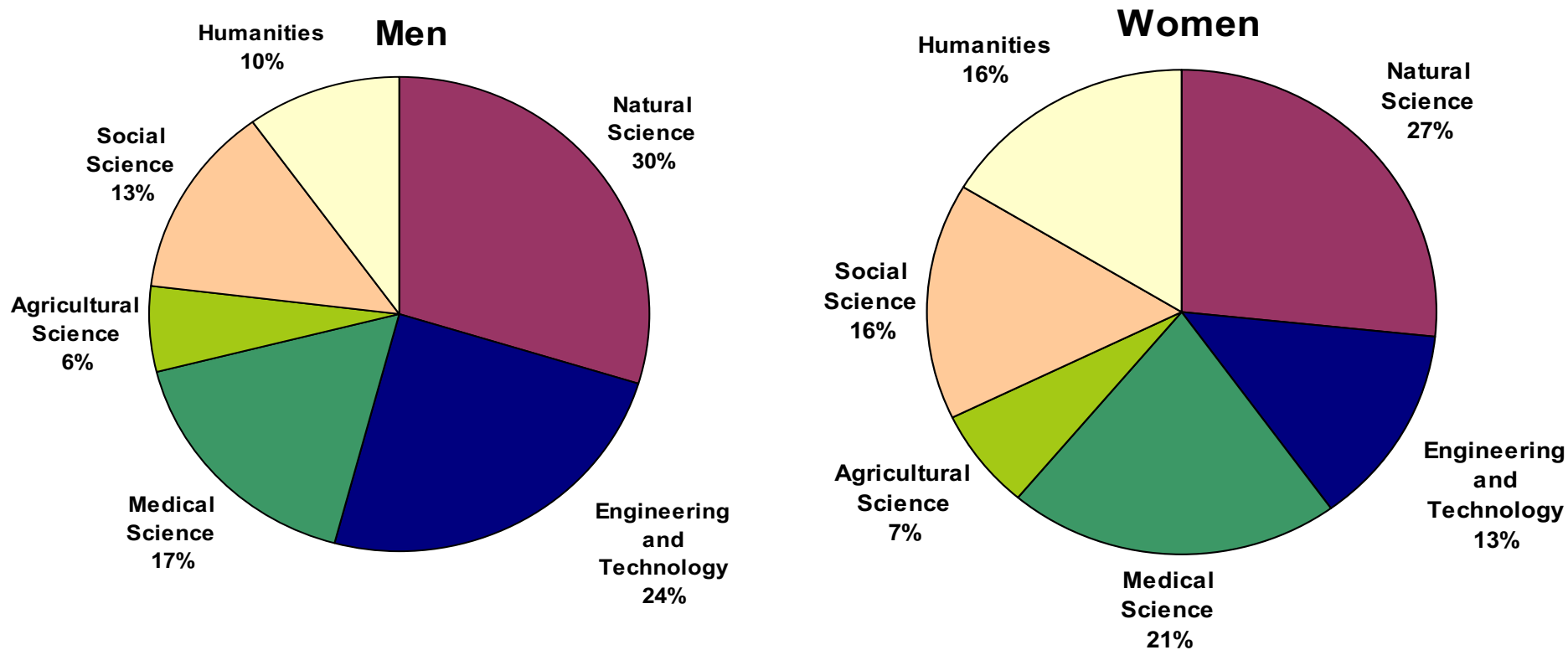
In more than **80%** of the World's countries, women represent **less than 45% of Researchers.**



Representation of Women in Sectors of Employment and Fields of Science

The number and proportion of women researchers varies widely between countries, but also between sectors and fields

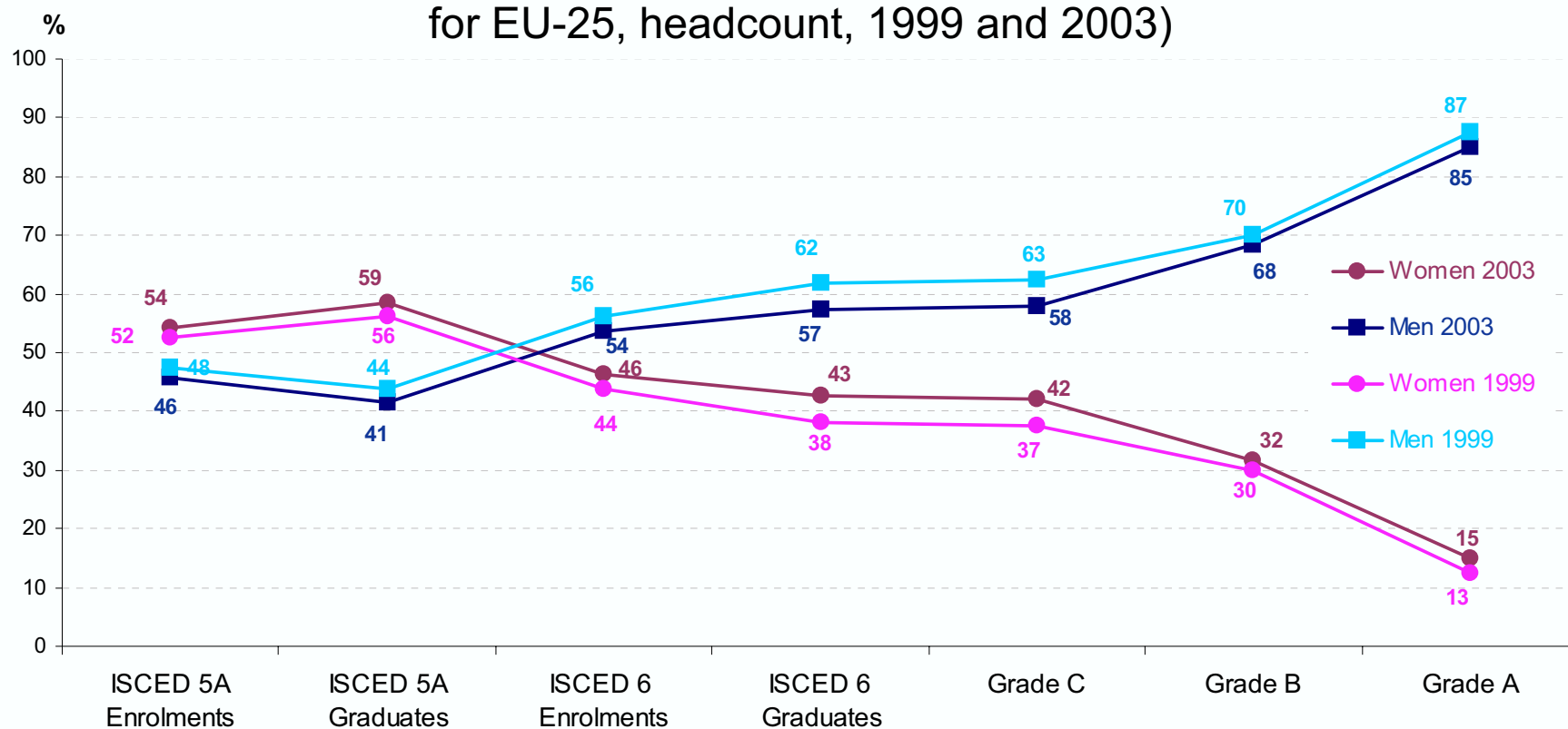
Researchers in EU-25 by main scientific fields and sex (HES, FTE)



“Scissors Diagrams”

Gender gap at the highest stages of the academic career is beginning to close, but at a very slow pace in EU countries

European Union (Relative share of women & men in a typical academic career for EU-25, headcount, 1999 and 2003)

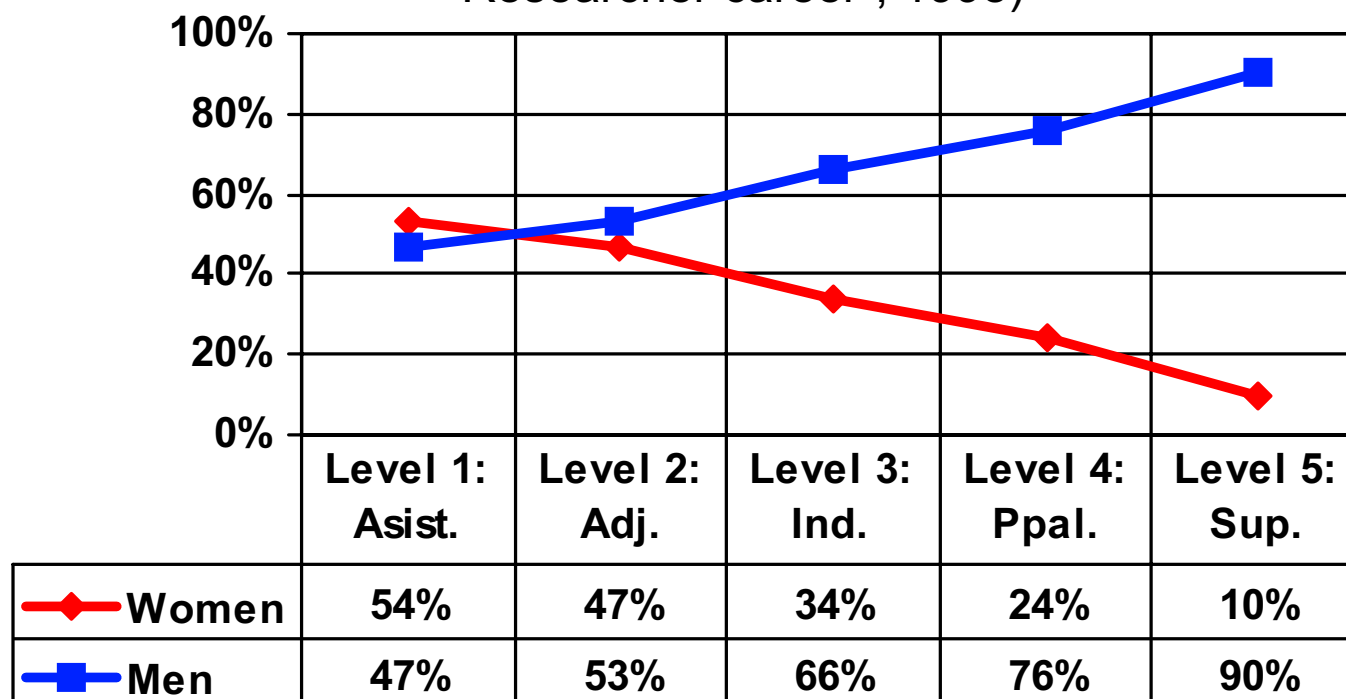


Source: European Commission; Students –Eurostat, Academic Grades – WiS database, 2003

“Scissors Diagrams”

Female researchers outnumbering males like in Argentina, does not imply lack of vertical segregation

Argentina (Distribution by categories in the Carrera del Investigador CONICET - Researcher career-, 1998)





Other Indicators on Gender, Science and Technology

- Density of researchers in the female labour force
- Funding success rates by gender
- Proportion of women in scientific boards
- ‘Honeypot Indicators’ - measures the triangular relationship between R&D expenditure and the concentrations of researchers in particular sectors or scientific fields of R&D and the sex composition of researchers in sectors or fields
- Output indicators, such as **patents, bibliometrics, citations** etc, with sex-breakdowns ???
- “Field Relative Parity Indexes” (FRPI) - reflects the relationship between a specific field’s degree of female participation and the average degree of female participation - **Over average (FRPI>1) or under average (FRPI<1)**
 - Engineering Relative Parity Index (ERPI)
 - Computing Relative Parity Index (CRPI)
 - Life Sciences Relative Parity Index (LSRPI)

Conclusions

- STG statistics have been progressively mainstreamed
- New indicators are available

However:

- information available is still insufficient
- provides only a partial picture

A better measurement of STG requires an important effort from the various stakeholders in order to produce quality statistics that respond to the demands of policy makers and at the same time allow better cross-national comparability.



Thank you!

<http://www.uis.unesco.org>

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