

Massification of higher education revisited

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Introduction

The purpose of this paper is to revisit time series data of students enrolled in higher education from a global perspective and provide a historical lens by which to better understand the unprecedented expansion it has taken place over the past forty or so years. In doing so it is hoped this paper provokes debate among academics and decision makers about the policy responses required from the observed shifts across national systems.

In revisiting time series data on the number of students enrolled in higher education (or tertiary education as it is also referred), collected by the UNESCO Institute for Statistics, it is also an opportunity to update prospective enrolments to 2035 and beyond by global region. The set of forecasts to 2035 were originally published by the author in 2012, using data drawn from UNESCO covering the period from 1999 to 2009.

To guide the reader, this paper is divided in the following sections:

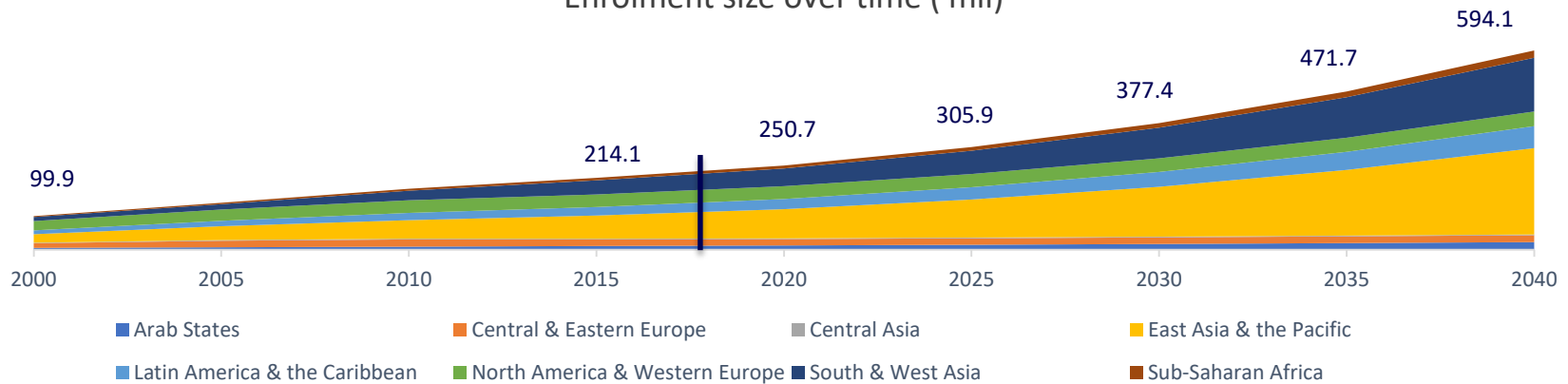
- **Section 1** provides an overview of enrolments globally and highlights key developments for every world region.
- **Section 2** focuses on some aspects about the massification of higher education, namely: gross enrolment ratios for tertiary education, enrolments as a share of the population and mega systems of higher education.
- As a precursor to providing detail about higher education enrolments to 2040, **Section 3** highlights population forecasts by world region.
- **Section 4** synthesizes the key findings of the higher education enrolment forecasts to 2040 by world region and provides estimates of enrolments as a share of the overall population.

Acknowledgments

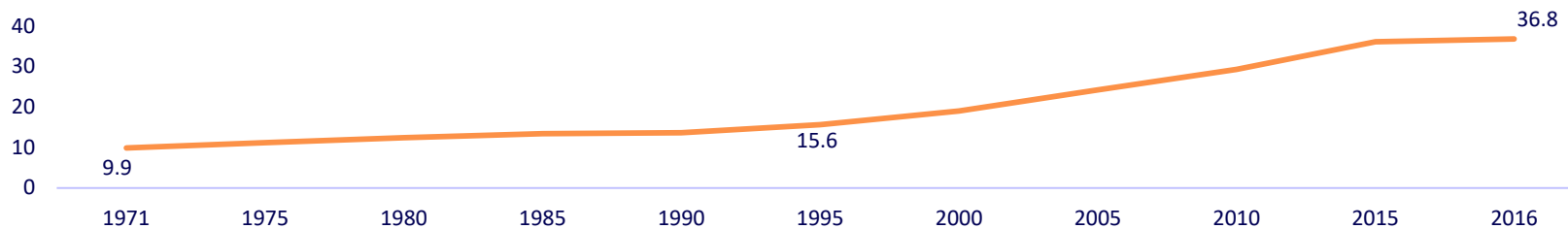
I thank the useful suggestions received from Martin Ince from Ince Communications; Victor del Rio from Red River Strategic Communication; Sean Lee, Sharron Jackson, John Le and Cat Gomes from RMIT University and Anand Kulkarni. Special thanks to Vanessa Tiong for the graphic artwork and to Maria Veronica Gandini (Universidad Nacional de Catamarca) for translating this report into Spanish.

Higher education in numbers

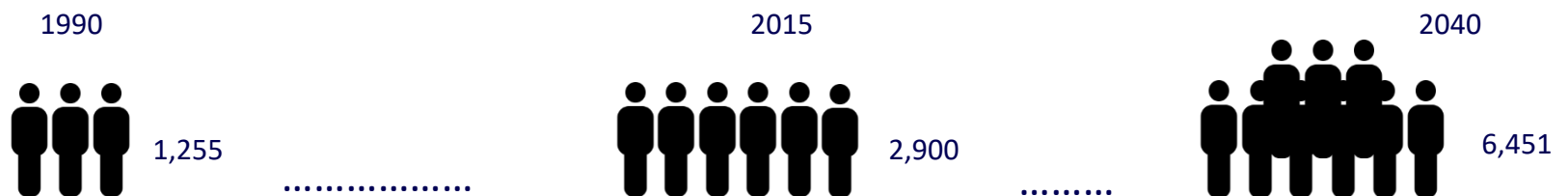
Enrolment size over time ('mil)



Gross enrolment ratio tertiary level over time – global



Enrolments per 100,000 inhabitants - global



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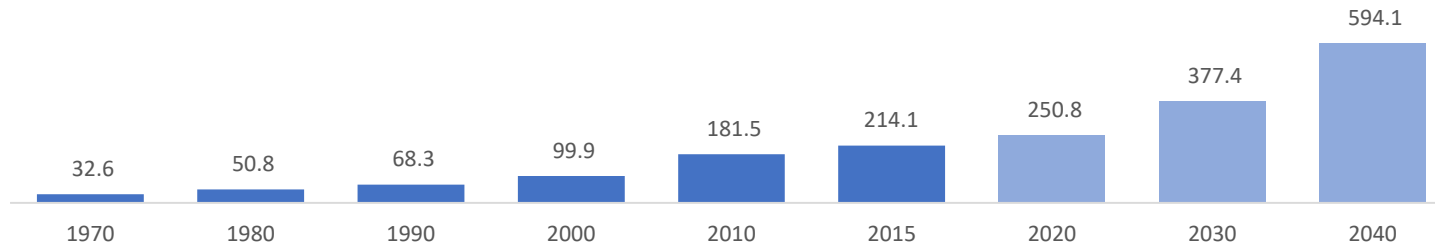
Section 1 – Global overview and regional shifts

Highlights by world region

Global overview

From 32.6 m students in 1970 to 594.1 m by 2040

Fig. 1: Global higher education enrolments
Actual 1970 to 2015 and Projection to 2040 (mil)



Source: Prepared by author, using data from UIS (2018)

- **The landscape of higher education globally continues to shift remarkably.** According to the UNESCO Institute for Statistics, in 1970 there were 32.6 million students enrolled in higher education institutions compared to 99.9 million in 2000. This represents an increase of 206% over this period.
- Although there are signs that enrolments in higher education around the globe are slowing down (in part influenced by a declining youth population and lower fertility rates), **it is estimated that by 2030 there would be 377.4 million, 471.4 million by 2035 and 594.1 million students by 2040.**
- This growth would represent an increase of 281% over the 30 years from 2000 to 2030; the **growth over the period from 2000 to 2030 is likely to be higher than that experienced between 1970 and 2000.**
- While the **expected growth of 4.2% per year** in higher education enrolments from 214.1 million in 2015 to 594.1 million by 2040 seem staggering, consider that the world economy doubled in size between 1990 and 2016 (WTO, 2017). Further consider, export in services from developing countries grew tenfold between 1990 and 2014 whilst growing at half the rate of service exports among advanced economies (Loungani, Papageorgiou & Wang, 2017). Even a small growth in percentage points a year add up over the long term.

Decision makers are urged to consider:

- The point of sustainability between the public versus private costs and benefits of tertiary education. **Unmet demand for tertiary education may arise if it is left to open markets.** The quality of national systems may be weakened if there is further erosion of the role of universities in the pursuit of national goals or mutually beneficial collective systems.
- **Online learning and other types and forms of delivery will continue to scale up.** The university's algorithm will be further altered by new emerging providers (with an industry- and job-oriented focus) and newer technologies shaping the curricula. For the sake of survival, institutions and entities will need to adopt blended modes, types and forms of delivery to suit a variety of stakeholders in different geolocations.
- Greater targeted efforts are needed to support **an increasingly culturally and ethnically diverse student (and academic staff) population as well as attaining gender balance.**

Global overview ... cont'd

Table 1: Global enrolments in higher education by region, 2000-2016 (' mil)

	2000	2005	2010	2015	2016
Arab States	5.1	6.9	8.7	10.7	10.8
Central & Eastern Europe	14.0	19.5	21.6	19.5	18.9
Central Asia	1.5	2.1	2.2	2.1	2.0
East Asia & the Pacific	25.3	41.3	55.3	69.4	70.9
Latin America & the Caribbean	11.5	16.1	21.6	25.3	26.2
North America & Western Europe	27.8	33.7	37.8	37.5	37.5
South & West Asia	12.2	16.1	28.5	42.2	42.2
Sub-Saharan Africa	2.6	4.1	5.8	7.4	7.4
World	99.9	139.6	181.5	214.1	215.9

Source: UNESCO Institute for Statistics, data accessed on 27 March 2018

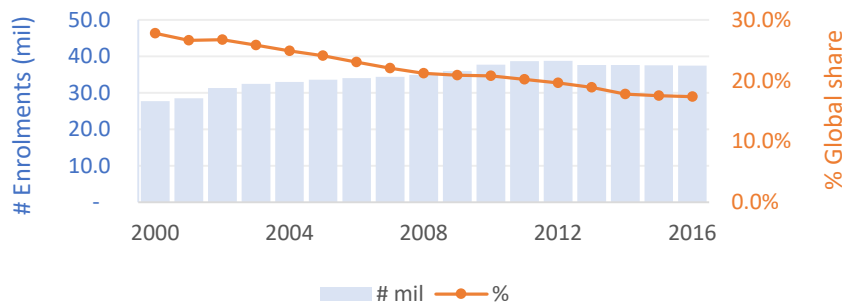
- The **United States** was the first country that experienced massification of higher education. During the first 30 years of the 20th century enrolments increased on average 5.5% per year from 237,592 in the fall of 1899/1900 to 1,110,737 in 1909/1910. During the years of the depression of the 1930s and during the years of World War II saw a decrease in participation in higher education but by the end of the 1940s enrolments surged once again. Between 1939/40 and 1949/50 enrolments increased almost by a million from 1.5 million to 2.4 million. During the 1960s growth in enrolments averaged 9.2% per year and during the 1970s enrolments averaged 4.2% per year (Snyder 1993). However, growth in enrolments in the United States averaged 1.2% per year between 2006 and 2015 (UIS, 2018).
- After the United States, **European countries** saw an increase in participation in higher education following War World II where advances in the sciences, technology and industrialisation resulted in an increased in production and improved living standards. These factors encouraged growth in participation in higher education in Europe. Enrolments in 28 European states (excluding the United Kingdom and Greece) totaled 2.3 million in 1950 and increased to over 6.3 million by 1965 (UNESCO, 1967). The expansion of higher education in the emerging countries of Asia commenced later, and in more recent years the rapid expansion in Latin America has taken place. In 1975, there were 5.1 million enrolments in East Asia & the Pacific and South Asia, increasing by 61% to 8.1 million by 1980. By contrast, in Latin America & the Caribbean enrolments went up by 38% from 3.6 million in 1975 to 4.9 million in 1980.

Regional shifts

East Asia & the Pacific overtook North America & Western Europe in 2003

Up to 2002 there were more students enrolled in higher education from North America & Europe than any other world region. In 2003, East Asia & the Pacific overtook North America & Western Europe both in highest volume and global share of enrolments. In 2014 South & West Asia overtook North America & Europe as the world's top third region. These shifts in enrolments are comparable with the United Nations' world population estimates as discussed in Section 2.

Fig. 2: North America & Western Europe enrolments and global share



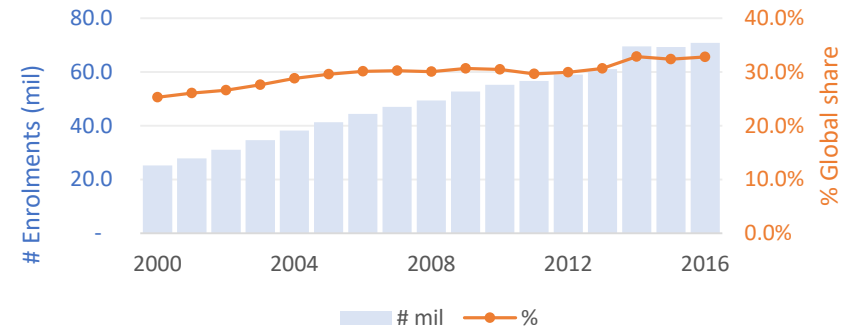
Source: Prepared by author, using data from UIS (2018)

Historically **North America & Western Europe** had the volume and greatest share of global enrolments. In 2002, there were 31.3 million students from the region which represented 26.8% of the world's total enrolments (117.0 million). The region's share of global enrolments declined 9.4 points to 17.4% in 2016 (and fourth region globally), even though enrolments have continued to rise to 37.5 million in 2016.

The shift from public to private funding for tuition and provision has weakened the region's overall performance. Governments need to continue delivering on improved educational pathway opportunities, lifting completion rates and providing meaningful labor market opportunities to graduates from disadvantaged background. These are critical in maintaining social and economic cohesiveness in such diversified societies.

Countries in this region with the largest number of enrolments are the **United States** (19.5 million in 2015), then followed by **Germany, France, the United Kingdom, Ireland, Spain and Italy** (all of which had between 1.9 million and 3.0 million enrolments in 2016).

Fig. 3 East Asia and the Pacific enrolments and global share



Source: Prepared by author, using data from UIS (2018)

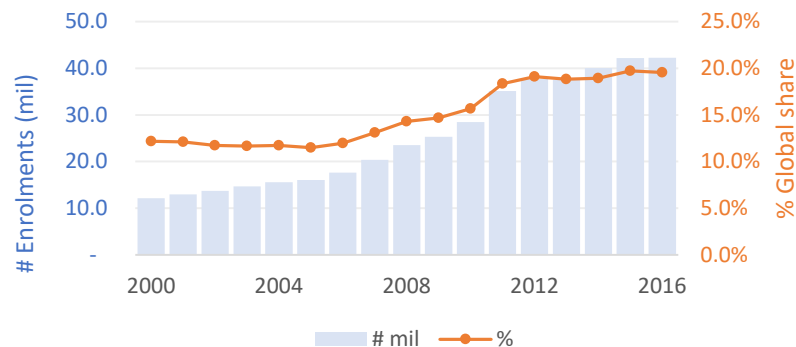
East Asia & the Pacific has become the epicenter of global higher education activity and is significantly driven by the steady growth of population and increased participation in tertiary education which is yet to reach equivalent levels like Central & Eastern Europe and North America & Western Europe. It is also the region that is progressively strengthening its research, knowledge and innovation footprint. For example, China published more papers compared to the United States in the field of Engineering and Technology during the period 2012 to 2017 (SciVal, 2018). The growth in enrolments in the region averaged 6.7% per year between 2000 and 2016, but it dropped to 4.6% per year between 2007 and 2016. In 2000, there were 25.3 million enrolments, increasing to 70.9 million by 2016.

Countries with the largest number of enrolments are **China** (43.9 million in 2016), followed by **Indonesia** (6.1 million), **Japan, Philippines and South Korea** (between 3.2 million and 3.8 million, respectively), then **Vietnam and Thailand** (with over 2.2 million each) and **Australia** (1.9 million). Several countries in the region (like **Myanmar, Cambodia and Laos**) are yet to see increases in participation in tertiary education.

Regional shifts

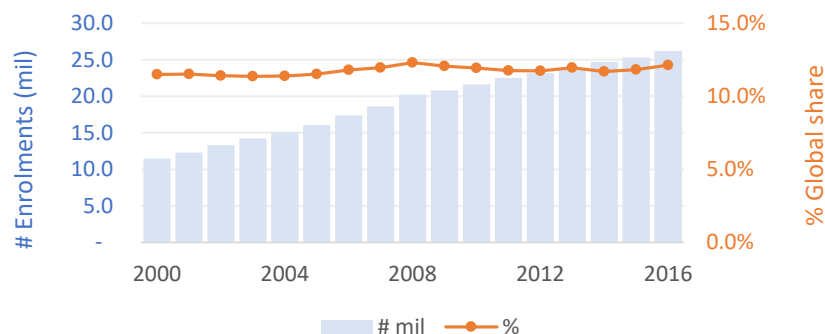
South & West Asia continues to expand rapidly followed by Latin America & the Caribbean

Fig. 4 South and West Asia enrolments and global share



Source: Prepared by author, using data from UIS (2018)

Fig 5. Latin America and the Caribbean enrolments and global share



Source: Prepared by author, using data from UIS (2018)

The next world region that is expanding at a faster rate compared to East Asia & the Pacific is **South & West Asia**, which had a compound annual growth of 8.1% between 2000 and 2016, and still higher at 8.4% per year between 2007 and 2016. In 2000, there were 12.2 million enrolments and increased to 42.2 million by 2016. Although the annual rate of growth slowed down to 2.9 per year between 2012 and 2016, South & West Asia is still a region that is yet to have a greater impact on the global higher education space.

To the extent that secondary education attainment rates improve and access and participation for disadvantaged students rise, the region's greatest impact could be visible – possibly over the next 15-25 years' time. Improvement to the quality of education, including better teacher preparation are necessary.

Countries with the largest number of enrolments are India (32.4 million in 2016), followed by **Iran** (4.2 million), **Bangladesh** (2.7 million) and **Pakistan** (1.9 million). Every country in this region (Iran excepted) have a GER at tertiary level under 30.0.

At the start of the 21st century, **Latin America & the Caribbean** ranked fifth globally in terms of overall enrolments in higher education, behind the above-mentioned regions and Central & Eastern Europe. In fact, Latin America & the Caribbean lagged behind Central & Eastern Europe by more than 2.4 million enrolments in 2000, and by 2016 Latin America & the Caribbean exceeded by 7.3 million. Growth in enrolments in Latin America & the Caribbean averaged 5.3% annually between 2000 and 2016 and slowed down to 3.9% per year between 2007 and 2016. Between 2012 and 2016 it grew by 3.1% per year between. In 2000, there were 11.5 million enrolments in Latin America & the Caribbean, increasing to 26.2 million by 2016. Since 2010, the region has had the fourth largest share of tertiary enrolments globally (12.1% in 2016).

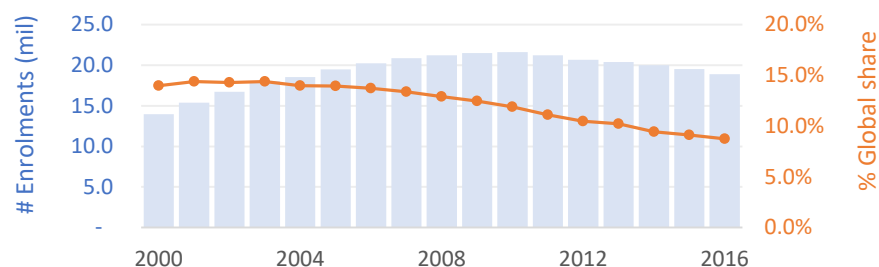
Growth in tertiary education participation in the region has been fueled through private consumption and provision in a region that is renown for profound inequality which hinders sustained development. Improved overall policy instruments and greater public investment are necessary.

Countries in this region with the largest number of enrolments are **Brazil** (8.3 million in 2016), followed by **Mexico** (4.2 million); then **Argentina** and **Colombia** (2.9 million and 2.3 million, respectively) and **Chile** (1.2 million).

Regional shifts

Global share of enrolments in Central & Eastern Europe decrease while Arab States remain stable

Fig. 6 Central and Eastern Europe enrolments and global share



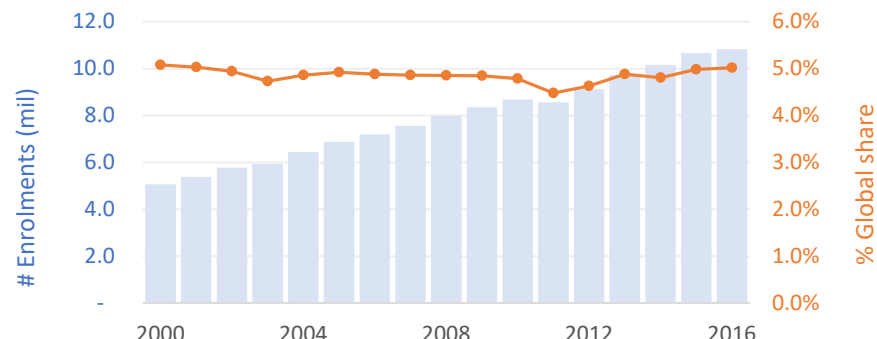
Source: Prepared by author, using data from UIS (2018)

Until 2007, **Central & Eastern Europe** was the region with the third highest volume of enrolments in higher education. In 2000, there were 14.0 million enrolments (14.0% global share), increasing to 21.6 million in 2010 and since then enrolments have declined to 18.9 million in 2016 (8.7% global share). This is a trend consistent with a decline in the population of the age group that typically corresponds to this level of education. Interestingly, Central & Eastern Europe is the world region that nine out of ten years between 2007 and 2016 had the highest number of students per 100,000 inhabitants (4,687 in 2016, second to North America & Western Europe with 4,772). Central & Eastern European countries have undergone significant transformation in every ambit since the breakdown of the Soviet Union.

The critical changes that have occurred in this region over the past 18 years are the breakdown of the state monopoly on education (and therefore giving rise to marketisation and private provision), the depolitisation of education and the repositioning of institutions in the context of European political and market integration (see Dobbins 2011).

Countries in this region with the largest number of enrolments are the **Russian Federation** (6.2 million in 2016), **Turkey** (6.1 million), then both **Ukraine** and **Poland** (1.7 and 1.6 million, respectively).

Fig. 7 Arab States enrolments and global share



Source: Prepared by author, using data from UIS (2018)

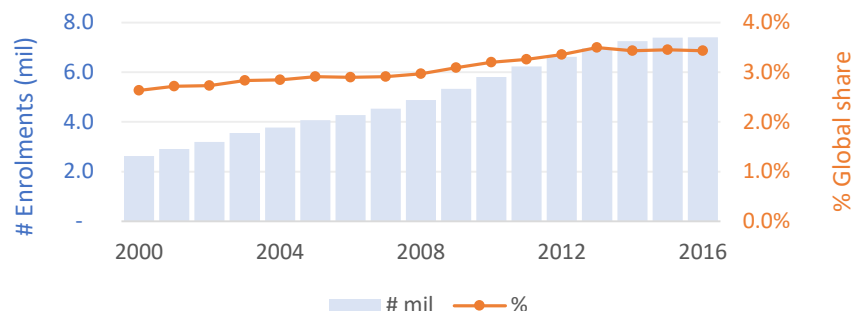
The overall share of global enrolments of **Arab States** remained stable over the period from 2000 to 2016. In 2000, there were 4.9 million enrolments in higher education (5.1% global share), increasing progressively to 10.9 million by 2016 (5.0% global share). Growth in enrolments averaged 4.9% annually between 2000 and 2016, but it decreased to 4.4% annually between 2012 and 2016. Another way by which to compare the region to other emerging regions is to compare the gross enrolment ratio of Arab States in 2016 (32.0%) which stood at the same level of Latin America & the Caribbean in 2006 or the world's average in 2012.

This improvement in participation is a result of increased diversification and focus on part of states to develop higher education, based on the US-style liberal arts institution model. Higher education reform in the region is confronted with a myriad of challenges that spread over demographic, political and economic considerations, and these are unlikely to overcome in the next 10 to 20 years' time (see for example Wilkens, 2011). States in this region with the largest number of enrolments are **Egypt** (2.8 million in 2016), followed by **Saudi Arabia** (1.6 million) and **Algeria** (1.4 million). Out of the 20 states included in this region, there is timely data for 14 and for the remaining six data lags four or more years.

Regional shifts

Enrolments in Sub Saharan continue to rise while Central Asia flattens

Fig. 8 Sub-Saharan Africa enrolments and global share



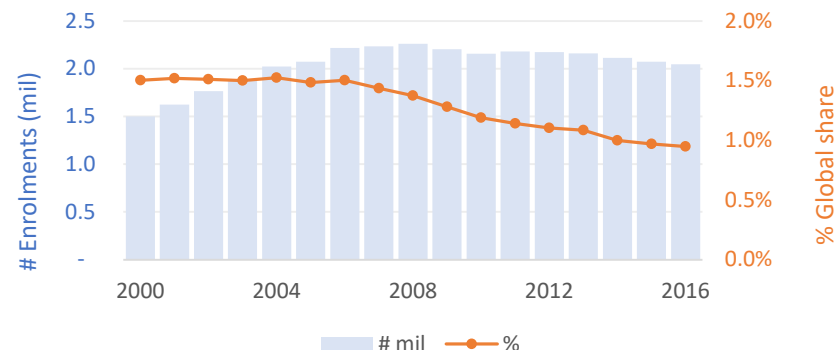
Source: Prepared by author, using data from UIS (2018)

Although the annual growth in enrolments in **Sub-Saharan Africa** (6.7%) was above the world's average (4.9%) and equal to that of East Asia & the Pacific between 2000 and 2016, only 8.5% of its eligible population in the age group participated in higher education in 2016. This rate of participation is significantly lower than any other world region. Of concern is the fact that the annual growth in enrolments between 2012 and 2016 declined to 2.8%.

The deacceleration in growth reflects the challenges the region confronts in financing higher education and for institutions in the region absorbing the demand that has resulted from increased completion rates in secondary education. In 2000, there were 2.6 million students enrolled in higher education (2.6% global share), increasing to 7.4 million by 2016 (3.4% global share).

Countries in this region with the largest number of enrolments are **Nigeria** (1.5 million in 2011), followed by **South Africa** (1.1 million in 2015), then **Ethiopia** (0.8 million in 2014) and **Democratic Republic of the Congo** and **Ghana** (under 0.5 million between 2014 and 2016). Like the Arab States, there is also limited capacity in this region in the systematic capture and reporting of statistical information, which inhibits the ability for national systems to undertake long term planning.

Fig. 9 Central Asia enrolments and global share



Source: Prepared by author, using data from UIS (2018)

While **Central Asia** had the smallest number of enrolments of all world regions in 2016, it had a higher education participation rate (25.7%) above Sub-Saharan Africa (8.5%) and South & West Asia (25.0%) in 2016. Growth in enrolments average 2.0% annually between 2000 and 2016, but it has resulted in negative growth since 2009. In 2000, there were 1.5 million enrolments in higher education and peaked in 2008 at 2.3 million, declining since then to 2.0 million by 2016.

The likelihood that enrolments in tertiary education increase considerably over the next 20 or so years are not feasible as the region has a declining share of the population that corresponds to the age cohort (i.e. 18-23) that participates in higher education.

Countries in this region with the highest volume of enrolments are **Kazakhstan** (0.6 million in 2017), then **Uzbekistan** and **Tajikistan** (0.3 million each in 2017).

Section 2 – Gross enrolment ratios and enrolments as a share of the population

Massification and changes in participation explained over time

Gross enrolment ratios and population growth

To better illustrate the extent to which massification of higher education has occurred, a brief examination is done about the number of students enrolled in tertiary education over the 5-year age group starting from the official secondary school graduation age. This relative measure of participation provides an insight into the overall level of education of a given region or country, and relative preparedness of young persons to enter the work force and provides basis for comparison across regions and countries. A higher GER also highlights a degree of relative economic prosperity.

Table 2: Gross enrolment ratio, tertiary education by world region, 1971-2016

	1971	1975	1980	1985	1990	1995	2000	2005	2010	2015	2016
Arab States	6.1	7.7	9.9	11.3	11.3	14.1	18.5	22.2	25.5	31.2	32.0
Central & Eastern Europe	29.9	29.2	30.5	33.4	34.2	32.6	43.1	58.8	69.1	77.2	77.7
Central Asia			24.2	24.6	25.4	22.8	22.2	27.0	24.9	25.3	25.7
East Asia & the Pacific	3.0	3.8	5.3	6.9	7.4	10.4	15.4	23.1	27.8	41.6	43.9
Latin America & the Caribbean	7.0	11.3	13.5	17.5	16.8	18.6	22.6	30.7	39.9	46.8	48.4
North America & Western Europe	30.9	35.6	38.4	41.0	48.8	60.1	60.4	70.4	77.3	76.6	76.7
South & West Asia	4.3	4.4	4.5	5.5	5.7	5.6	8.8	10.3	17.3	25.1	25.0
Sub-Saharan Africa	0.9	1.1	1.8	2.4	3.0	3.7	4.4	5.9	7.4	8.5	8.5
World	9.9	11.2	12.4	13.4	13.6	15.6	19.0	24.2	29.3	36.1	36.8

Source: UNESCO Institute for Statistics, data accessed on 6 April 2018

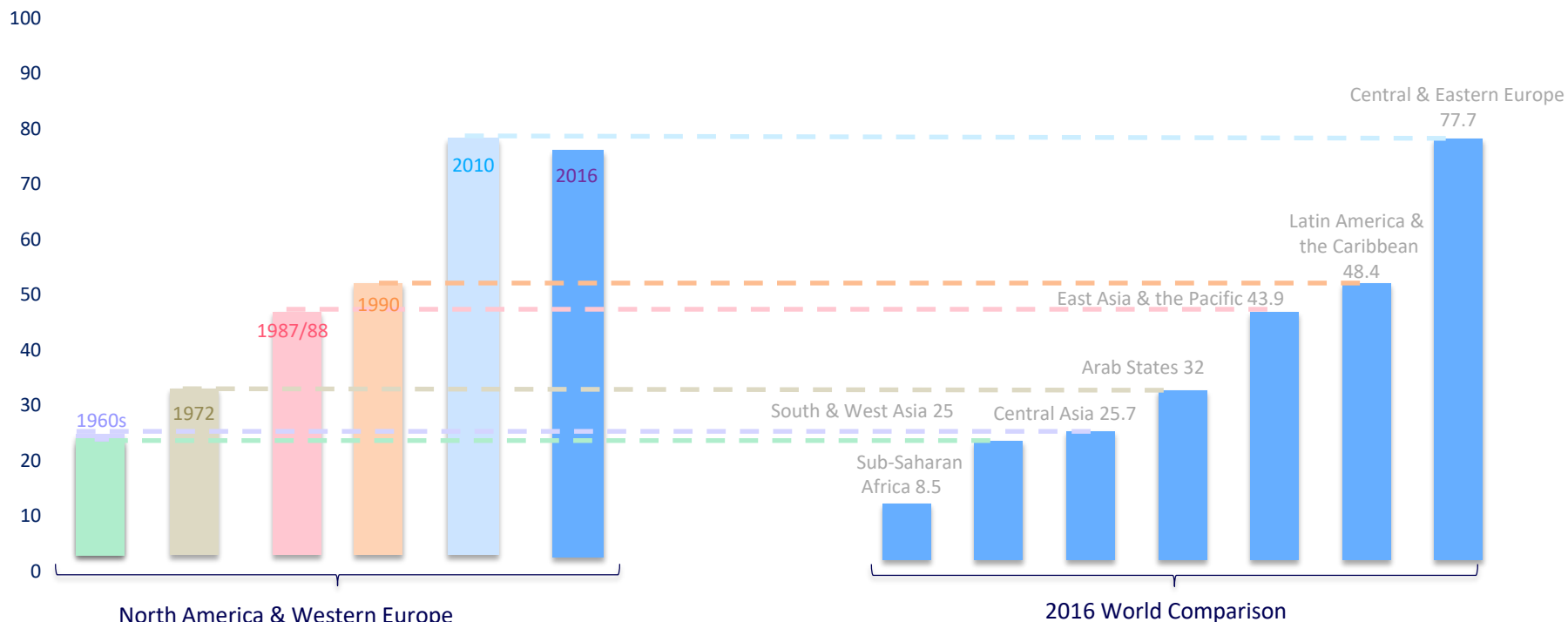
The gross enrolment ratio (GER) by world region is shown in Table 2. As it can be seen, the world's ratio has increased from 9.9% in 1971 to 36.8% in 2016. Significant year-on-year gains started to occur from 1994 and gathered pace at the start of the 2000s. In part these gains reflect outcomes of globalization but also of improvements made in several different facets (e.g. increased participation of women in education and labor force, higher secondary education completion rates and improved access to higher education) (World Bank, 2000). **North America & Western Europe** which traditionally had the highest enrolment ratios was overtaken by **Central & Eastern Europe** in 2015. Countries from Central & Eastern Europe started to report substantial growth in student enrolments at the start of the 1990s as many of these countries started to embark on political, social and economic transition and long lasting reforms.

Both **Latin America & the Caribbean** as well as **East Asia & the Pacific** regions are most likely to have reached a 50% enrolment ratio by 2018. Countries from both of these regions have also made significant gains since they embarked on a number of economic and societal reforms, although there are improvements yet to be realised in many other countries which are lagging in reform and increased investment in education.

Gross enrolment ratios and population growth – cont'd

On a regional basis, there are significant differences in the level of participation in higher education. To put it in context, using North America & Western Europe as the benchmark, it is observed that in 2016:

- Sub-Saharan Africa stood half way where North America & Western Europe was pre 1960s
- South & West Asia stood where North America & Western Europe was in the 1960s
- Central Asia stood where North America & Western Europe was in the 1960s
- Arab States stood where North America & Western Europe was in 1972
- Latin America & the Caribbean stood where North America & Western Europe was in 1990
- East Asia & the Pacific stood where North America & Western Europe was in 1987/88
- Central & Eastern Europe stood where North America & Western Europe was in 2010



Source: Prepared by author, using data from UIS (2018)

Gross enrolment ratios and population growth – cont'd

Massification explained

The term 'massification' denote mass enrolments in a national system and the term was first used by Martin Trow.

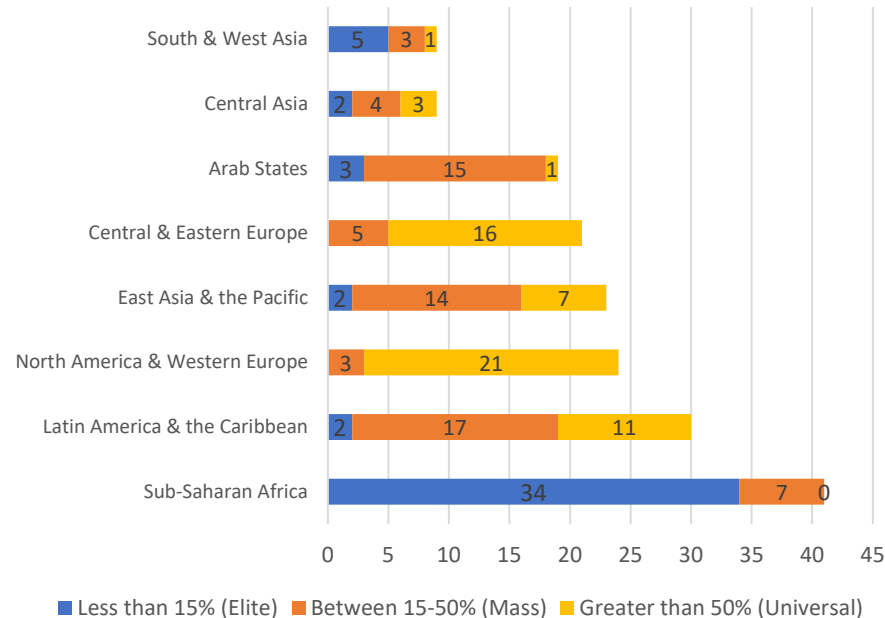
Another lens by which to view the current standing of national systems in terms of development and participation in education is to map it against Martin Trow's conceptions of elite, mass and universal higher education. In Trow's views (2006):

- An 'elite system' is one in which the prevailing attitude is that access to higher education is a privilege of birth or talent or both. In terms of measurement it means less than 15% of the population that correspond to that age cohort (18 to 23 years old for tertiary education) participate in higher education. The function of higher education in an 'elite system' is about shaping the mind and character of the ruling class.
- A 'mass system' is one in which the prevailing attitude is that access to higher education is a right for those with certain qualifications. It means that up to 50% of the population that corresponds to that age cohort (18 to 23 years old for tertiary education) participate in higher education. The function of higher education in a 'mass system' is the transmission of skills and the preparation of the population for broader range of technical and economic elite roles.
- A 'universal system' is one in which the prevailing attitude is that access to higher education is an obligation for the middle and upper classes. It means that over 50% of the population that corresponds to that age cohort (18 to 23 years old for tertiary education) participate in higher education. The function of higher education in a 'universal system' is about the adaption of whole population to social and technological change.

60 countries have a universal system

Out of 176 countries for which gross enrolment ratios for tertiary education are available from UNESCO, 60 (or 34%) of these have a 'universal system' of higher education. Unsurprisingly the countries with such systems are foremost found in North America & Western Europe (88%) followed by Central & East Europe (76%). 68 countries (or 39% out of 176) have a 'mass system' or are in transition to having an 'universal system and the region with the highest proportion of countries in this category is the Arab States, followed by East Asia & the Pacific and then Latin America & the Caribbean. 48 countries (or 27%) have an 'elite system' and these are predominantly found in Sub-Saharan Africa. Figure 10 shows the distribution by world region.

Fig. 10 Number of countries by region according to Trow's elite, massive and universal systems



Gross enrolment ratios and population growth – cont'd

By mapping Trow's higher education conceptions to the standing of national systems, based on the latest available data from UNESCO, one sees how the transformation of countries from 'elite' to 'universal' systems have evolved over the past forty years. In doing so the significant investment, as well as political and social commitments required to attain such a change can be observed.

Consider, the path that countries such as **Chile, Korea and Turkey** having a GER under 10.0 % in 1970 had a ratio that exceeded 90.0% in 2016; or the leap progress made by countries such as **Colombia and Iran** that have attained a 'mass system' over the past twenty years. Further consider, China has invested considerably in education since the 2000s and had moved from having a ratio of under 10% in 2000 to attain a 48.4% GER by 2016. It is highly likely that **China will attain a ratio of 60% within the next five years and 70% within 10 years' time**. In examining the historical data from UNESCO and the annual statistical companion from the U.S. National Center for Education Statistics it appears likely that China will attain a comparable GER at the tertiary level to that of the United States within the next 20 to 25 years' time.

Fig. 11 Gross enrolment ratio, tertiary education, selected countries

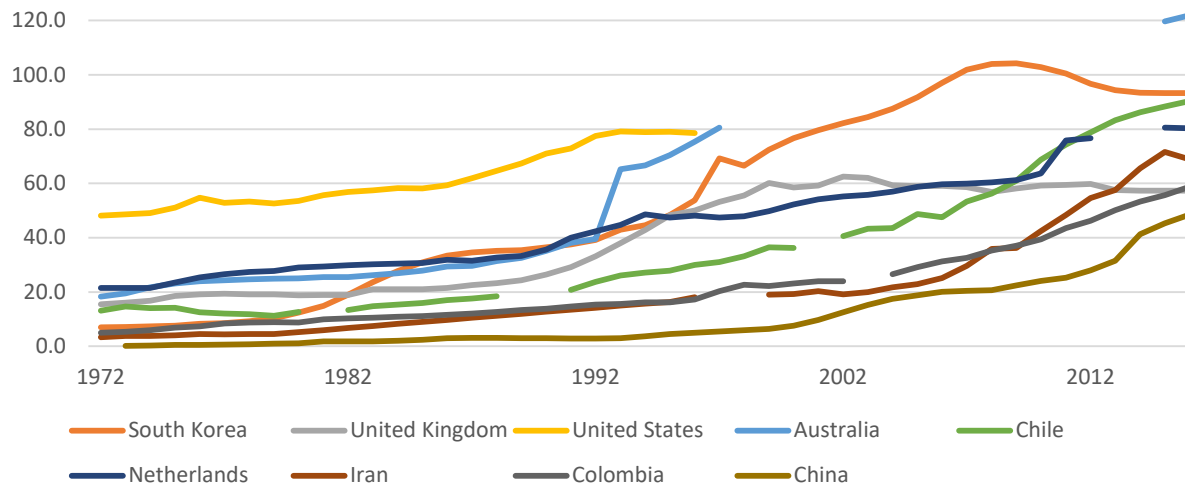
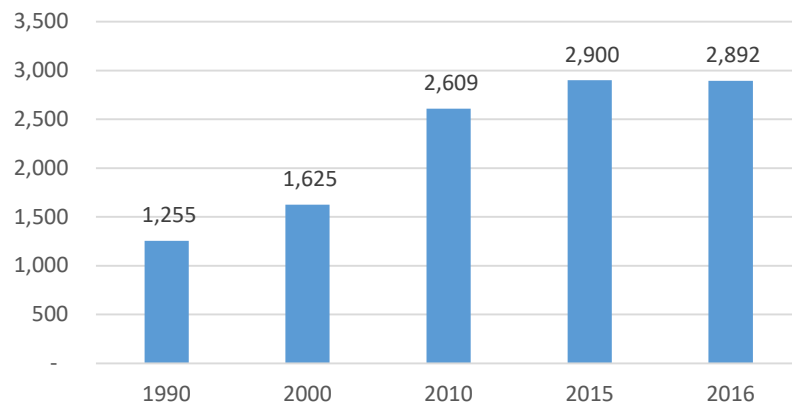


Figure 11 illustrates the GER evolution for selected countries from the 1970s to 2016. There are some years for which data is not available, hence the gap between years as shown in the graph. For example, the latest year for which data for the United States is 1998 with a GER of 71.6% down from 78.6 in 1996.

Higher education enrolments as a share of the population

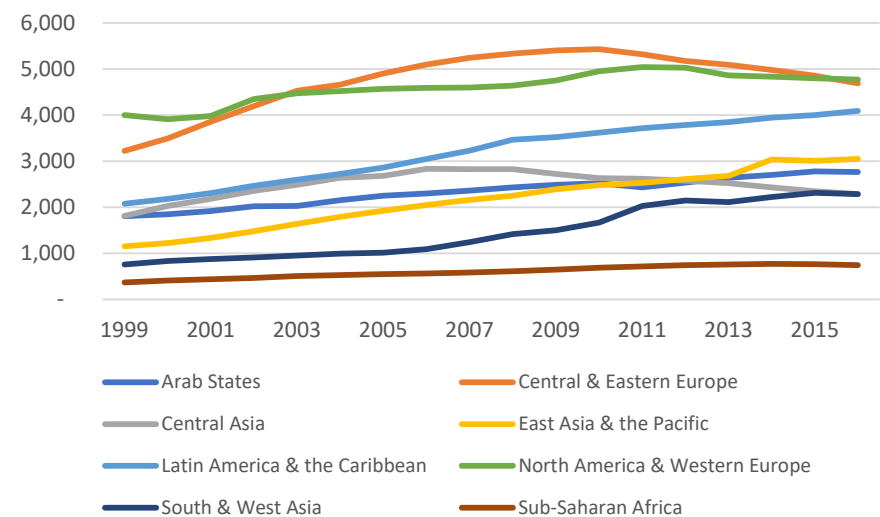
Another lens by which to show the geopolitical shift that is gradually taking place is to see the proportion of the population that participates in higher education. Globally there were 1,255 students per 100,000 inhabitants in 1990, increasing to 1,625 by 2000 and then it continued to rise to 2,900 in 2015. In 2016, there was a slight decrease to 2,892 and it was the second year in about twenty it declined. The other year in which there was a decline was in 2013 to 2,764 from 2,767 in 2012.

Fig. 12 Number of students per 100,000 inhabitants globally, 1990-2016



Source: Prepared by author, using data from UIS (2018) and UN (2017a)

Fig. 13 Student enrolments in higher education as a share of population (per 100,000 inhabitants)



Source: Prepared by author, using data from UIS (2018) and UN (2017a)

On a regional basis, **Central & East Europe** had the highest participation for many years and has plateaued, while **North America & Western Europe** regained standing in 2016 it had lost in recent years. Over the 10-year period between 2007 and 2016, the region that experienced the greatest growth was **South & West Asia** which increased by 83% from 1,247 to 2,288 per 100,000 inhabitants, followed by **East Asia & the Pacific** increasing by 41% from 2,162 in 2007 to 3,053 in 2016.

In 2016, the regions that had the greatest proportion of population in higher education (more than 4,000 students per 100,000 inhabitants) were Central & Eastern Europe, North America & Western Europe and Latin America & the Caribbean, while Sub-Saharan Africa had the lowest (747 students per 100,000 inhabitants).

Mega systems of higher education

33 national systems with over 1 million enrolments

- One of the outcomes in the ongoing expansion of higher education systems across borders is that there is an increasing number of countries with national systems that are considerably large in scale.
- China and India have over 30 million enrolments; followed by the United States (over 19 million), then Brazil with over 8 million enrolments. **There are 17 countries which enrol between 2 million and 6 million students**, which range from Thailand, Colombia, Vietnam and the United Kingdom to Russian Federation, Indonesia and Turkey. **Further, there are 12 countries with enrolments between 1 million and 2 million students** which include South Africa, Chile, Spain and Australia. In addition, there are 13 countries with a national system that goes from half a million to under a million enrolments, which are Dominican Republic, Belgium, Netherlands and Morocco.
- Another way in which this expansion of higher education is manifested is by the number of institutions globally. Estimates vary on the number of institutions – from 14,000 as recorded by the International Association of Universities to over 20,000 as noted by Webometrics. In the United States alone, the number of HEIs has increased from 3,599 in 1990/91 to 4,583 in 2015/16 (NCES, 2018).

Table 3: Countries with greater than 1 million higher education enrolments - 2016 ('m)

Rank	Country	Enrolments	Rank	Country	Enrolments	Rank	Country	Enrolments
1	China	43.9	12	Republic of Korea	3.3	23	Australia	1.9
2	India	32.4	13	Germany	3.0	24	Pakistan	1.9
3	United States	19.5	14	Argentina	3.0	25	Italy	1.8
4	Brazil	8.3	15	Egypt	2.8	26	Ukraine	1.7
5	Russian Federation	6.2	16	Bangladesh	2.7	27	Saudi Arabia	1.6
6	Indonesia	6.1	17	France	2.4	28	Poland	1.6
7	Turkey	6.1	18	Colombia	2.4	29	Nigeria	1.5
8	Iran	4.3	19	United Kingdom	2.3	30	Algeria	1.4
9	Mexico	4.2	20	Viet Nam	2.3	31	Malaysia	1.3
10	Japan	3.8	21	Thailand	2.2	32	Chile	1.2
11	Philippines	3.6	22	Spain	2.0	33	South Africa	1.1

Source: UNESCO Institute for Statistics, data accessed on 27 March 2018

Section 3 – Global population forecasts

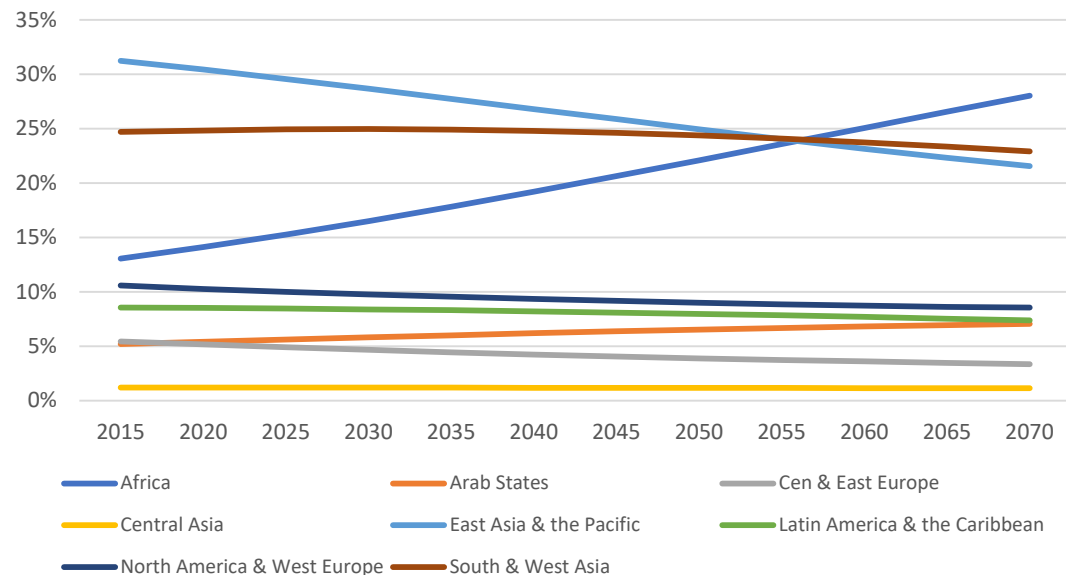
Highlights of world's population estimates

Global population forecasts

The world's population shifts Africa's way by 2060

- In 2015, the world's total population stood at 7.4 billion and is expected to increase to 8.9 billion by 2035. An extra 318 million persons are expected by 2040 for a total of 9.2 billion persons, according to forecasts from the UN Department of Economic and Social Affairs.
- Annual growth in the world's population is slowing down due to lower fertility rates which in turn lead to an older population overall. The world's population aged 60+ is expected to increase from 12.3% in 2015 to 18.8% by 2040. In addition, large movement of migrants continue to occur between countries and across regions and often these movements go from low- and middle-income countries to high-income countries. Further, higher life expectancy is also a factor to consider in development and population forecasts, particularly the gap in life expectancy at birth between the least developed countries and other developing countries are progressively diminishing.
- As a proportion of the world's population, **Sub-Saharan Africa share is increasing, while there is a relative decline in the overall population for East Asia & the Pacific and South & West Asia**. Figure 14 shows the estimated trajectory and the point of intersection in share of population for these regions. In 2015, 2.3 billion people lived in East Asia & the Pacific followed by 1.8 billion people in South & West Asia and 965 million people lived in Sub-Saharan Africa. **By 2060, Sub-Saharan Africa will have the greatest share of the world's population followed by South & West Asia and then East Asia & the Pacific.**

Fig. 14 Share of the world population's estimates by region, 2015-2070



Source: Prepared by author, using data from UN (2017a)

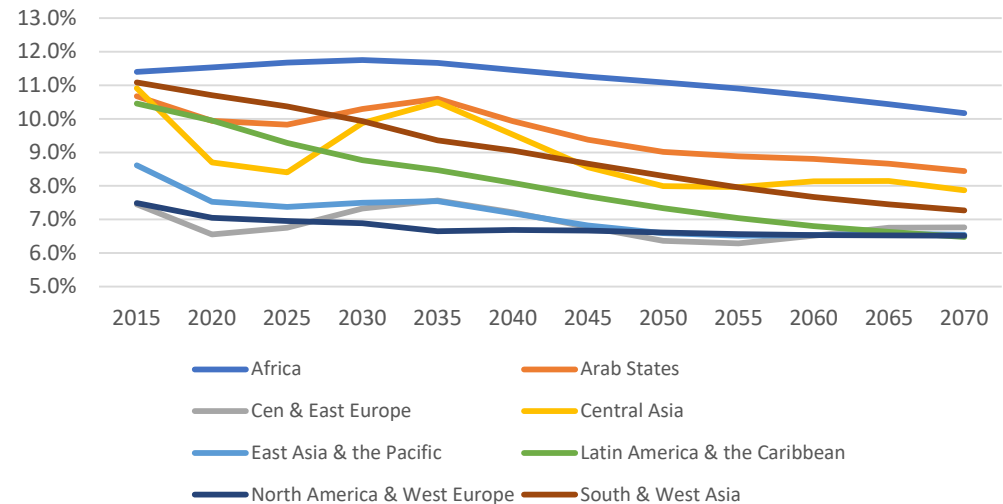
- By 2040, the world's landscape is likely to feel vastly differently, particularly as a result of the geopolitical shifts that have occurred as a consequence of demographic changes but also due to technological transformation.
- Fig 14 suggests that the population shifts Africa's way by 2060. Progressively we will be experiencing a variety of changes and the world order that prevailed 25 or 50 years earlier will be fondly remembered. Unless issues of inequality, resource scarcity and climate change are addressed, such tensions will remain relevant and a driving source of social discontent. It is likely that many countries that hold today economic power will be weakened.

Global population forecasts – cont'd

800 million people by 2040 is the eligible population for tertiary education

- In 2015, there were 715 million people aged 18-23 globally. According to the UN population estimates, this cohort population annual growth is projected to peak at 5% by 2030 and then it will continue to grow at a much-reduced rate.
- By 2040, it is projected there will be 800 million people aged between 18 and 23. As a proportion of the overall population, people aged 18 to 23 represented 9.7% in 2015 in contrast to 1985 when it represented 11.4%. The population aged 18 to 23 has been decreasing since 1985 and it is expected that by 2030 it will represent 9.0%, 8.4% in 2040 and 8.2% by 2050.
- Figure 15 illustrates the decline in the population aged 18-23 from South & West Asia and Latin America & the Caribbean; the fluctuation over time in the same cohort population from Arab States and Central Asia. Central & East Europe and North America & Western Europe had the lowest proportion of the population aged 18-23 in 2015 and are expected to remain with the lowest proportion by 2050 and beyond. East Asia & the Pacific, which had the highest proportion of the population aged 18-23 in 1990 (12.6%) is expected to have the second lowest proportion by 2050 (6.6%).

Fig. 15 Share of the world's population 18-23 estimates by region, 2015-2070



Source: Prepared by author, using data from UN (2017a)

- 74% of the expected growth for the population aged 18-23 from 2015 to 2035 will be concentrated in ten countries (Angola, Democratic Republic of the Congo, Egypt, Ethiopia, Kenya, Niger, Nigeria, Pakistan, Uganda and Tanzania). Eight of those countries are also remaining the world's top population growth countries for the 18-23 cohort population between 2015 and 2050. Egypt and Kenya will be replaced by Iraq and Mozambique. However, in terms of the overall population, 51% of the expected concentration of growth will be in ten countries (China, Democratic Republic of Congo, Egypt, Ethiopia, India, Indonesia, Nigeria, Pakistan, Tanzania and the United States).
- The concentration of population growth both in terms of those aged 18-23 and overall population is a key challenge to governments and universities globally in how best to plan for the years ahead, address policy imperatives and fulfill institutions' mission in continuing to deliver tertiary education for the overall population.

Section 4 – Enrolments forecasts to 2040

Highlights of higher education enrolment forecasts by world region (including estimates of enrolments as a share of the overall population) and parting thoughts

Projected enrolments

As noted in the introduction, the earlier forecasts of the expected number of students enrolled in higher education to 2035 published in 2012 were based on data from the UNESCO Institute for Statistics (UIS) which covered the period 1999 to 2009 (Calderon, 2012).

Since 2012, a number of developments have occurred which make a revision of the set of forecasts necessary. First the UIS has updated the time series data and as at 1 April 2018 the data covers the period from 1999 to 2016. Secondly, there were new population estimates released by the UN Department of Economic and Social Affairs in 2017 which are used to determine the proportion of the population expected to participate in higher education to 2040. Thirdly, despite the lingering effects of the global financial crisis, there was a positive feel back in 2012 on the global outlook for society and the economy. Fast forward to 2018, there are deepening concerns about the world's stability and rising geopolitical uncertainty in many countries worldwide and how it may impact on higher education.

Aside from demographic shifts, the projected enrolments presented in this section take into consideration a number of key drivers that are influencing the global society and economy, such as:

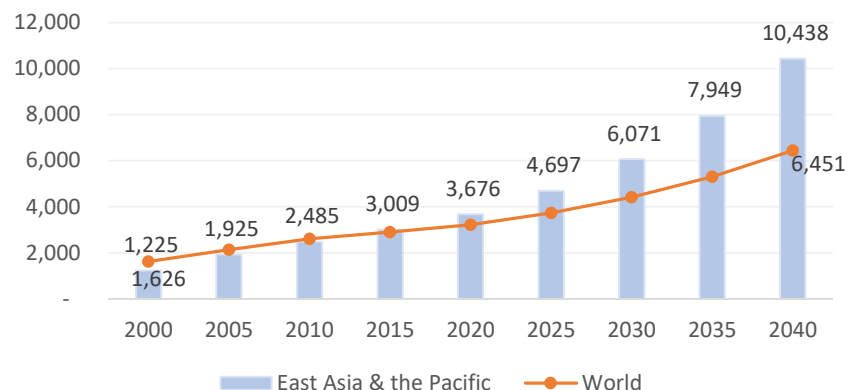
- **Geopolitical shifts** are altering the balance of power, the dynamics of trade (including educational services and the mobility of people) and social norms. Consider, the continued rise of China (and flow on effects on trade and political influence across world regions) and the rise of nationalism and populism in many countries are critical developments that come to mind in considering long term enrolment forecasts.
- The process of **urbanization remains unabated**. In 1950, 29.6% of the world's population lived in urban centres. By 2000, 46.65% of the world's population lived in urban centres and the most urbanised world regions had more than 70% of its population living in urban centres and **by 2050, 66.4% of the world's population will live in urban centres**.
- To the extent that urbanization has shaped the transformation of the world's economy over the past seventy years, the **technological revolution is equally having such an impact in changing the world's economy**. Access to technology and the transformation it has enabled has contributed to making education more accessible and affordable to those who seek it and less costly for providers. **Automation, artificial intelligence and every technological development are defining the global labour market landscape and their overall societal impact is a work in progress.**

Projected enrolments by region

Globally, the number of enrolments in higher education is expected to increase from 214.1 million in 2015 to 250.7 million by 2020 and it is expected it will continue to rise to 377.4 million by 2030 and 594.1 million by 2040. On a regional basis:

- **East Asia & the Pacific** is expected to remain the region with the highest volume and share of enrolments, increasing to 148.8 million (39.4% share) by 2030 and **257.6 million (43.4% share) by 2040**. The number of students per 100,000 inhabitants is expected to rise from 3,009 in 2015 to 6,071 by 2030 and 10,438 by 2040, being the region with the highest proportion globally.
- Countries in the region are at varying stages of development. Whilst there is significant improvement in participation, quality of education and investment, there are many societal challenges (e.g. gender and minority inclusion).

Fig. 16 Number of students per 100,000 inhabitants in East Asia & the Pacific, 2000-2040

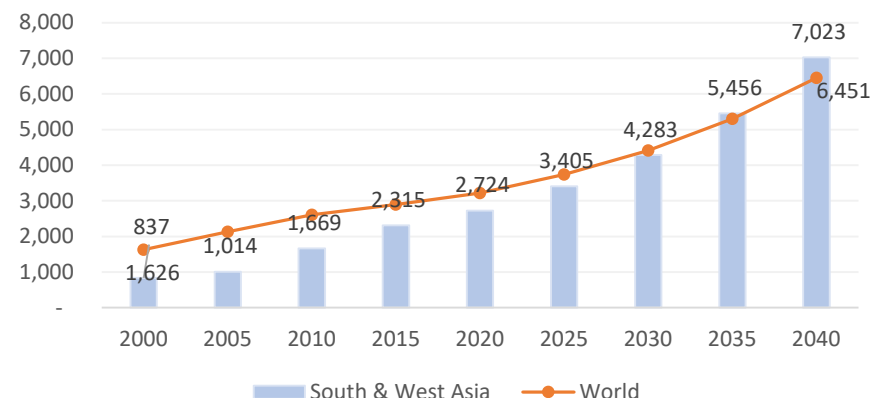


	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	69.4	87.2	113.6	148.8	196.0	257.6
World's share	32.4%	34.8%	37.2%	39.4%	41.6%	43.4%

Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

- **South & West Asia** is expected to be the region with the second highest volume of enrolments, increasing to 91.4 million by 2030 and then increasing to **160.4 million by 2040 for a global share of 27.0%**. The number of students per 100,000 inhabitants is expected to rise from 2,315 in 2015 to 4,283 by 2030 and 7,023 by 2040, going from being the region with the second lowest proportion in 2015 to being third highest globally by 2040.
- Again, countries in the region are at varying degrees of development and with considerable disparities between each other. Compared to East Asia & the Pacific, funding, quality of education and delivery remains paramount challenges which may take some decades to reduce the gap.

Fig. 17 Number of students per 100,000 inhabitants in South & West Asia, 2000-2040



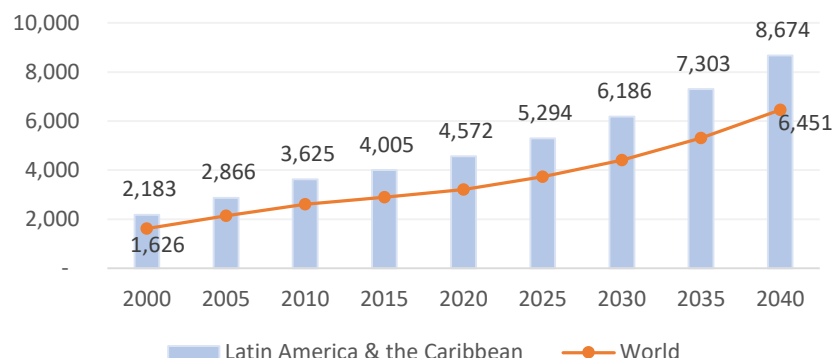
	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	42.2	52.7	69.5	91.4	120.9	160.4
World's share	19.7%	21.0%	22.7%	24.2%	25.6%	27.0%

Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

Projected enrolments by region - continued

- **Latin America & the Caribbean** is expected to experience an increase in enrolments from 25.3 million in 2015 to 36.7 million by 2030 and then rise to **65.6 million by 2040**. The rate of growth in enrolments from this region is likely to slow down from about 2025 due to population shifts and lower fertility rates. The number of students per 100,000 inhabitants is expected to rise from 4,005 in 2015 to 6,186 by 2030 and 8,674 by 2040, going from being the third highest region to being the second highest proportion globally by 2040.
- Key challenges are: Improving quality of education and competitiveness of institutions together with higher secondary education completion rates and increased tertiary education retention rates. Private provision is likely to remain strong over the next 20 years.

Fig. 18 Number of students per 100,000 inhabitants in Latin America & the Caribbean, 2000-2040

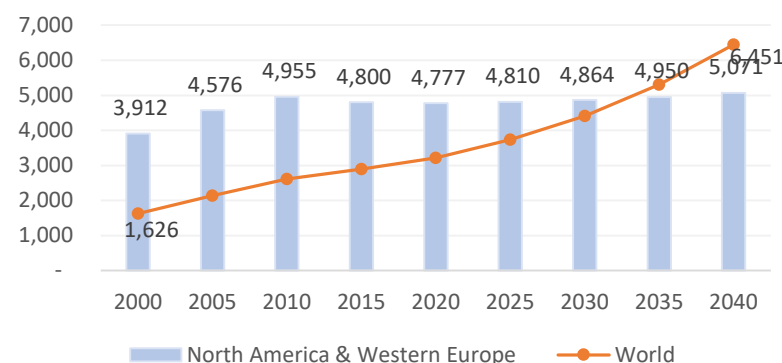


Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	25.3	30.4	36.7	44.4	54.0	65.6
World's share	11.8%	12.1%	12.0%	11.8%	11.4%	11.0%

- **North America & Western Europe** is expected to further experience a decline in its share of global enrolments from 17.5% in 2015 to 10.7% by 2030 and 7.4% by 2040. Enrolments are expected to reach 40.6 million in 2030 and **43.7 million by 2040**, in part growth in enrolments is driven by international migration. The number of students per 100,000 inhabitants is expected to rise from 4,800 in 2015 to 4,864 by 2030 and 5,071 by 2040, going from being the region with the second highest proportion in 2015 to being fifth highest globally by 2040. This shift is explained by the decline in population.
- Key challenges are: Improving pathway opportunities, lifting participation rates from disadvantaged and minority groups as well as lifting tertiary education completion rates and tuition affordability. Further fragmentation of the sector is envisaged given the economic and social instability that will hinder investment in tertiary education

Fig. 19 Number of students per 100,000 inhabitants in North America & Western Europe, 2000-2040



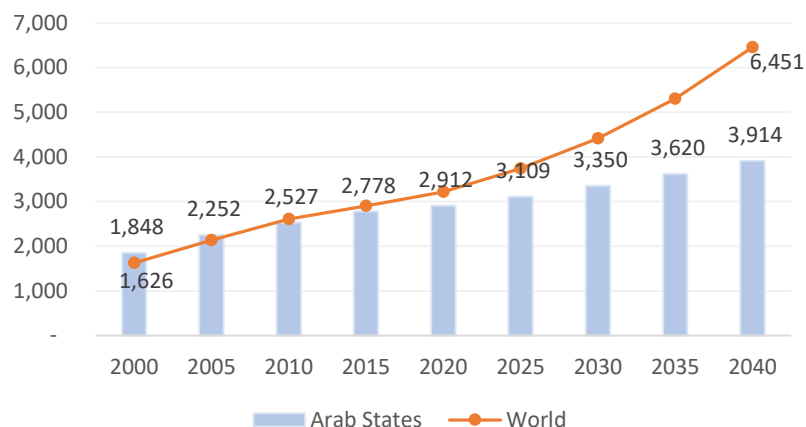
Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	37.5	38.3	39.4	40.6	42.1	43.7
World's share	17.5%	15.3%	12.9%	10.8%	8.9%	7.4%

Projected enrolments by region - continued

- The **Arab States** region is expected to have a greater number of **enrolments (22.3 million) by 2040** compared to **Central & Eastern Europe (20.5 million)**. Enrolments in Arab States are expected to double in number from 10.7 million in 2015 to 22.3 million by 2040, while the number of enrolments in Central & Eastern Europe are marginally increasing between 2015 and 2040 driven by a declining overall population.
- In the **Arab States**, the number of students per 100,000 inhabitants is expected to rise from 2,778 in 2015 to 3,350 by 2030 and 3,914 by 2040, going from being the region with the fifth highest proportion in 2015 to being sixth highest globally by 2040. There are many challenges, e.g.: Widening opportunities for participation in education, building institutional capacity and quality of delivery.
- In **Central & Eastern Europe**, the number of students per 100,000 inhabitants is expected to rise from 4,712 in 2015 to 4,933 by 2030 and 5,367 by 2040, going from being the region with the highest proportion in 2015 to being fourth highest globally by 2040. Key challenges are: Ageing and decreasing population limit scope for increased participation in education; new providers entering the market and political instability is eroding attractiveness of the European higher education space.

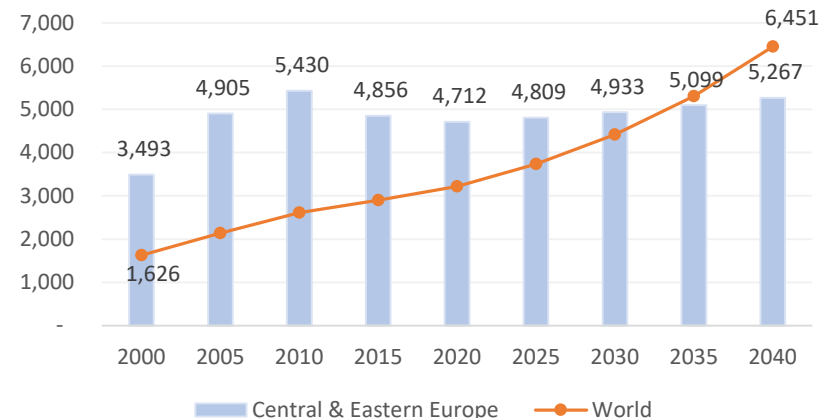
Fig. 20 Number of students per 100,000 inhabitants in Arab States, 2000-2040



Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments (mil)	10.7	12.3	14.3	16.7	19.3	22.3
World's share	5.0%	4.9%	4.7%	4.4%	4.1%	3.8%

Fig. 21 Number of students per 100,000 inhabitants in Central & Eastern Europe, 2000-2040



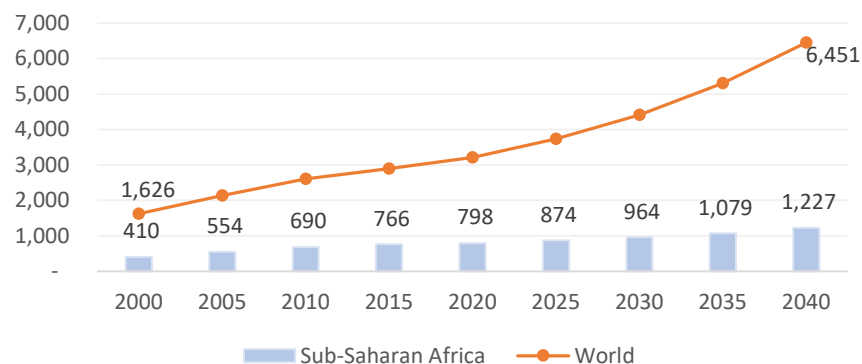
Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	19.5	19.1	19.4	19.7	20.1	20.5
World's share	9.1%	7.6%	6.3%	5.2%	4.3%	3.5%

Projected enrolments by region - continued

- **Sub-Saharan Africa** is expected to continue to experience strong growth in enrolments as more and more countries in the region make advances in strengthening their national systems of education and attain higher completion rates in secondary education. Enrolments are expected to increase from 7.4 million in 2015 to 8.8 million by 2030 and **21.7 million by 2040**. The number of students per 100,000 inhabitants is expected to rise from 766 in 2015 to 964 by 2030 and 1,227 by 2040, remaining at the bottom among all world regions from 2015 to 2040.
- There are many significant challenges but key are: Inadequate funding to support growth, access to education, quality of education and institutional capacity. To the extent that governments and international agencies support economic and societal development, the region will be positioned to attain higher levels of participation and attainment.

Fig. 22 Number of students per 100,000 inhabitants in Sub-Saharan Africa, 2000-2040

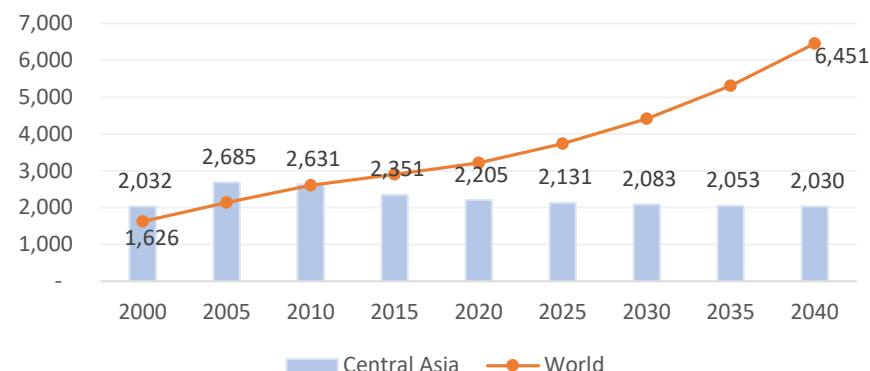


Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	7.4	8.8	10.9	13.6	17.1	21.7
World's share	3.5%	3.5%	3.6%	3.6%	3.6%	3.7%

- **Central Asia** is expected to see a marginal increase in the overall number of students enrolled in higher education from 2.1 million in 2015 to **2.2 million by 2040**. The number of students per 100,000 inhabitants is expected to rise from 2,351 in 2015 to 2,131 by 2030 and 2,030 by 2040, going from being the region with the sixth highest proportion in 2015 to being seventh highest globally by 2040.
- There is limited scope for increased participation in education because there is not a population growth, particularly in the 18-23 age cohort, sufficient to maintain systems of education expanding.

Fig. 23 Number of students per 100,000 inhabitants in Central Asia, 2000-2040



Source: Prepared by author, using data from UIS (2018) and UN (2017a); author enrolment estimates for 2020-2040

	2015	2020	2025	2030	2035	2040
Enrolments ('mil)	2.1	2.1	2.1	2.1	2.2	2.2
World's share	1.0%	0.8%	0.7%	0.6%	0.5%	0.4%

Final thoughts

Summary

- As noted in the 2012 edition of this paper, forecasting enrolments over a long period of time is a numbers game; a spurious one indeed filled with so many possibilities about the future.
- Readers are encouraged to focus on understanding the trends, be equipped to handle the uncertainties and ambiguities that we experience over time and determine the best possible path forward. This paper has drawn a picture of the continued massification of higher education and has described the shifts that we are witnessing globally. The nature and intensity of such shifts will have profound implications in the way higher education is planned, delivered, funded and quality assured across the globe. In particular decision makers need to recognise the critical role education plays in addressing issues of inequality, social disadvantage and removing barriers for preserving social cohesiveness at this time of global uncertainty and rapid technological transformation.
- The transition from “mass” to “universal” systems of higher education means that the majority of the population in every country feels entitled to (or at least contemplate the aspiration to) participate in higher education. While the opportunities for access are provided (often in the form of scholarships and alternative forms of entry) for many students, ongoing academic and financial support is often missing, and are key to higher completion rates.
- The appetite for enrolments in higher education will remain as strong as foreshadowed to the extent that students are able to complete their education, graduates are able to realise their career expectations as well as graduates maintain a wage premium in the labor market and are upwardly mobile.

Regional outlook

- **By 2035, countries from Sub-Saharan Africa** are likely to become the **sunrise markets for higher education**. 18 countries from this region will be in the top 50 in terms of volume for the population aged 18 to 23. In addition, 32 of Sub-Saharan Africa countries will be in the world's top 50 in terms of population growth for the 18 to 23 cohort. Countries from East Asia and the Pacific will continue to dominate in volume and are likely to be mature markets. **Countries from South & West Asia are likely to be sunshine markets by 2035/40**. Countries from Central & Eastern Europe, Central Asia are likely to remain flat market. The growth that is likely to be seen in countries from North America & Western Europe are likely to be driven by continued movement of persons.
- More than ever before, the composition of the world's population will shape the basis for the regional make up of those who participate in higher education (and determine the movement of people across borders). Past 2040, the world's population mix will likely feel different how to manifest their higher education given the composition of the population that participates in education.
- Forward estimates on population growth (both 18-23 cohort and overall population) suggest that **by 2035-2040 the expected growth in student enrolments in higher education will flatten in some countries in East Asia & the Pacific** (e.g. China and Indonesia), Central & East Europe (e.g. Russian Federation), Latin America & the Caribbean (e.g. Chile). Developing countries are likely to be the new generators for enrolments in higher education **by 2040** and it **may be the beginning of a new era in the geopolitics of higher education**.

Appendix - About sources and method

For this analysis, the following datasets were used

- Data on student enrolments in higher education (or tertiary education) for the period from 1999 to 2016 from the UNESCO Institute for Statistics (UIS), which acts as the United Nations (UN) depository for global statistics in education. Data extracted on 27 March 2018.
- Data on gross enrolment ratio (tertiary level, both sexes, percentage) was also downloaded from the UIS on 6 April 2018.
- Data on population estimates from the UN Department of Economic and Social Affairs. The data file refers to the total population (both sexes combined) by broad age group, region, sub-region and country, 1950-2100 (thousands). The medium fertility variant from 2015 onwards. The data file was released in June 2017 and downloaded on 10 October 2017.

The dataset on student enrolments used for the 2012 version of this report was based on the information available in March 2012 and covered the period from 1999 to 2009. For this revised analysis, the data file downloaded on 6 April 2018 was used, meaning that the data points from 1999 to 2009 were discarded entirely.

On a number of ways the 2012 and 2018 editions differ:

- Firstly, the 2018 analysis used updated data points which cover all period under consideration (1999 to 2016). It is not uncommon that data points are updated from year to year as statutory authorities in every country and territory may review coverage of tertiary education statistics.
- Secondly, the 2018 edition uses additional years of data, which include the period from 2010 to 2016. As discussed in Section 1, observed growth in enrolments by country and by region in recent years are somewhat weaker compared to the growth observed in the first decade of the 21st century. The lingering effect of the global financial crisis is a key factor in what growth has been observed over recent years.
- Thirdly, controlling for the share of the population that participates in education on a per capita basis has been a useful tool to observe fluctuations over the years and has prompted further interrogation on external factors at play.
- Fourth, the sentiment that prevails in 2018 is less upbeat than the one felt in 2012. Greater consideration was given to geopolitical factors (without minimizing the significance of the major forces of change) and the degree of uncertainty these might have over the long term (either regionally or on a country by country basis).

For every world region there are different growth rates forecasted. This is consistent with the trends observed over the past 20 years which vary from country to country and from region to region. The forecast results were cross-checked and adjusted based on scanning the external environment and considering the major forces of change.

References

- Calderon, A. 2012. Massification continues to transform higher education. University World News. Issue No. 237. Retrieved from <http://www.universityworldnews.com/article.php?story=20120831155341147>
- Dobbins, M. 2011. Higher Education Policies in Central and Eastern Europe. New York: Palgrave Macmillan.
- Loungani, P., Mishra, S., Papageorgiou, C and Wang, K. 2017. World Trade in Services: Evidence form a new database. IMF Working Paper (WP/17/77).
- National Center for Education Statistics (NCES). 2018. Digest of Education Statistics: 2016. Retrieved from https://nces.ed.gov/programs/digest/d16/tables_3.asp
- SciVal. 2018. Scopus data at 2 April 2018. Retrieved from www.scival.com
- Snyder, T. 1993. 120 Years of American Education: A Statistical Portrait. Rep. U.S. Department of Education: National Center for Education Statistics.
- Trow, M. 2006. Reflections on the Transition from Elite to Mass to Universal Access: Forms and Phases of Higher Education in Modern Societies since WWII. In J. J. F. Forest and P. G. Altbach (Eds.), International Handbook of Higher Education (pp. 243-280). Dordrecht: Springer.
- UNESCO. 1967. Access to higher education in Europe. Conference of Ministers of Education of European Member States of UNESCO on Access to Higher Education. Vienna.196
- UNESCO Institute for Statistics (UIS). 2018. Education stats database. Retrieved from <http://uis.unesco.org/>
- UNESCO Institute for Statistics (UIS). 2014. Higher Education in Asia: Expanding out, expanding up. Montreal: UNESCO.
- United Nations, Department of Economic and Social Affairs, Population Division (2017a). World Population Prospects: The 2017 Revision.
- United Nations, Department of Economic and Social Affairs, Population Division (2017b). World Population Prospects. Retrieved from <https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html>
- Wilkens, K. 2011. Higher Education Reform in the Arab World. Saban Center at Brookings.
- World Bank, 2000. Higher Education in Developing Countries: Peril and Promise. Washington: The International Bank for Reconstruction and Development.
- World Trade Organization (WTO). 2017. World Trade Report 2017. Trade, technology and jobs. Geneve.