Trends in higher education

Statistical trends in nine Western-European countries

1990-1999

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Introduction

This presentation is based on the third trendreport in the framework of the CHEPS Higher Education Monitor. In this report the statistical trends over the period 1990-1999 on a number of key indicators from the CHEPS database is presented for the following nine countries: Austria, Denmark, Flanders, Finland, France, Germany, The Netherlands, Sweden and the United Kingdom.

The indicators described in this trendreport are chosen according to a basic model of the operation of a higher education system. This model focuses on the flow of students through the higher education system. The three characteristics of the flow of students are: the inflow of students (new entrants), the stock of students (enrolment) and the outflow of students (graduates). The main resources used are staff and financial resources.
New lines in higher education

Main issues

• Student flows
• Rate of participation
• Staff
• Public expenditure
• Conclusion
New lines in higher education

Studentflows

Based on an input-process-output model, the indicators on the studentflows through a higher education system are:

New entrants  ➔  Students (undergraduate)  ➔  Graduates (undergraduate)  ➔  Graduates (PhD level)

Notes
For these indicators, the trend has been calculated by taking the 1990-level as base (=100)
New lines in higher education

New entrants

The number of new entrants is the early warning indicator regarding the output of the higher education system. A decline in the number of new entrants in year \( t \) will lead to a decline in the number of graduates in year \( t+x \) (\( x \) being the average time to complete in years).

A new entrant is a student enrolled for the first time in any higher education institution, in any programme.

Higher education comprises all undergraduate programmes at all higher education institutions (except for France where only the public universities are covered).

To compare the trends, the 1990-level is set on 100 for all countries (except France).
New lines in higher education

New entrants, 1990=100
At the end of the 1990-1999, after a period of decline, the number of new entrants in French higher education was stable. In the UK there has been a substantial growth since 1990. The decline and stabilisation in German higher education has changed into growth since 1998.

The increase in the number of new entrants in Swedish higher education of the first half of the period has continued, after a two-year period of decline. In the Netherlands, after a period of stabilization, the number of new entrants has grown again. In Austria, the 1990s showed some fluctuation with a high in 1995 and 1999.

The number of new entrants in Finnish higher education shows a huge increase, due to the introduction of the polytechnics (AMK) (scale on the right hand axis). Compared to that, the steady growth in Denmark is rather modest. In Flanders the number of new entrants has stabilized since the mid 1990s.
Enrolment is a central indicator in describing higher education systems in an international comparative perspective. In many systems it is also used as an important criterion for allocating public resources.

In terms of student flows, enrolment represents the stock of people who participate in higher education. The stock is filled by the inflow of new entrants and depleted by the outflows of graduates and drop-outs.

Enrolment comprises all undergraduate programmes at all higher education institutions. Data refer to headcount enrolment.
New lines in higher education

Students, 1990=100
New lines in higher education

Students, 1990=100

Contrary to the UK, enrolment in German and French higher education has been stable since the second half of the period 1990-1999. UK enrolments show a steady growth in the early 1990s. In the late 1990s, growth was relatively low.

Enrolment in Dutch higher education has fluctuated slightly, but in the end has not grown substantially since 1990. In Austria the total number of students shows a modest growth, while, on the other hand, enrolment in Sweden shows a strong growth. In the second half of the period, enrolments have developed along similar lines in these three countries.

Like the number of new entrants, the number of enrolled students in Finnish higher education shows a huge increase (right hand axis), all created by the introduction of the polytechnics (AMK). Over the period 1990-1999 the growth in the number of students in Denmark and Flanders is rather modest (the decrease in Flanders is due to a change of datasources in Flanders).
New lines in higher education

Graduates

In international comparisons, the number of graduates is seen as the main (teaching related) output of a national higher education system. Although higher education may have added some value to ‘drop-outs’, this value-added is not taken into account as output in international comparisons. This is due to the lack of consistent and comparable data.

The number of graduates provides also important information to determine how well the higher education system fulfills the need of the national labour market.

The number of graduates comprises all undergraduate programmes at all higher education institutions.
New lines in higher education

Graduates, 1990=100

France

Germany FRG

Germany

UK university

UK

New lines in higher education

Graduates, 1990=100
In both France and the UK, the number of graduates has grown over the 1990-1999 period. In Germany, the pattern of growth turned into decline in 1997.

Contrary to the growth in both the number of new entrants and enrolled students in Swedish higher education, the number of graduates shows a modest increase. The same accounts for the increase in the number of graduates for the Netherlands and Austria.

Because of the huge increase in both the number of new entrants and the total number of students in Finnish higher education, the number of graduates also shows a huge increase over the 1990-1998 period. The steady growth in Flanders is rather modest, while the number of graduates in Denmark are still growing in size since 1990.
In many continental higher education systems, the undergraduate degree is seen as the first degree, with which the graduate may enter the labour market. In addition, higher education institutions offer a wide variety of postgraduate programmes. Although these programmes become more and more important, there is still no reliable and comparable information on their number of graduates.

The only type of postgraduate programme such information is available on are the PhD or doctorate programmes.

Graduates comprise all PhDs awarded, both to students in PhD-programmes at higher education institutions and PhDs awarded in other schemes.
New lines in higher education

Graduates (post-graduate programmes), 1990=100
Over the period 1990-1999, the number of graduates from post-graduate programmes has grown in **France, Germany** and the **UK**. In France however, the production of new doctors has declined since 1997.

After a strong growth of **Dutch** graduates from post-graduate programmes in the beginning of the 90’s, a more stable pattern emerged after 1996. In **Austria**, the number of graduates from post-graduate programmes has growth slowly during the 1990s (except for the peak in 1996). In **Sweden** a huge increase can be seen over the 1990-1998 period.

The strong growth in **Denmark** was interrupted in 1996 and 1997. Since 1998, the production of doctors is back on the upward track. In **Finland** the number of post-graduate graduates is still increasing (although the latest year shows a stabilisation). In **Flanders**, the growth process is slightly erratic. Growth and decline follow up on each other rather quickly.
The rate of participation indicates what part of the (young) population of a country experiences an initial higher education programme. Whether they complete that programme is in this view not relevant.

A high rate of participation throughout a number of years indicates that a society and its active labour force is relatively well educated. Since both Western societies in general and their economies are more and more knowledge based, this indicator yields highly relevant information for policymakers.

There are two main definitions used: the net rate of participation and the gross rate of participation.

The net rate of participation is calculated as the number of students enrolled of age $X$ as a percentage of the population of age $X$. The calculation results in a graph.
Participation in **Flanders** and **France** is concentrated in the younger age groups, whereas in **Germany**, **Denmark**, and **Austria** participation is more spread out over the age-groups.
Although the net rate of participation graphs are informative regarding the distribution of relative enrolment by age, they lack the clarity of one numerical score. To derive such a score, we use a two-step procedure. First we calculate the surface of the area of the graph by adding the scores per age-group. Given the interpretation of the indicator it does not matter how long a student is enrolled. The results of this first step however is very much influenced by the duration of stay: the longer a student is enrolled, the higher the score will be. Therefore a second step is needed. In this second step we divide the result by the average duration of stay in higher education.

The results of this two step procedure are presented in the next graph.

Notes

The formal length of the programmes is used as a proxy of the average duration of stay.

Programmes with different length (within one country) are weighted with their relative enrolment.
The net rate of participation is highest in Finland, France and Denmark. In Germany and Austria the net enrolment is low. The low score is to some extent due to the relative long duration of stay in these two countries. The very slow growth of the rate of Austria and Germany however are another indication of the low position of these countries.
New lines in higher education

Gross rate of participation

The gross rate of participation is used by many international organisation like UNESCO. It is calculated by dividing total enrolment in higher education by the size of a relevant age-group of the population. UNESCO uses as an age-group the population aged 18-22 years or 19-23 years.

The main flaw of this indicator is the insensibility regarding the variety in programmes and age-structure of the studentbody.

The scores on the gross rate of participation, based on CHEPS data, are presented in the next graph.
The scores on the gross rate of participation differ substantially from the scores on the net rate of participation. The gross rates of participation are in much smaller range (except Flanders). The position of the Netherlands is remarkably low, compared to the previous graph.
New lines in higher education

New entrants in natural science and engineering

The number of new entrants in both natural science and engineering can be seen as an important issue in the discussion about the position of higher education in society, as the number of new entrants is the early warning indicator regarding the output of the higher education system. A decline in the number of new entrants in year $t$ will lead to a decline in the number of graduates in year $t+x$ ($x$ being the average time to complete in years).
New lines in higher education

New entrants in natural science, universities, 1990

The number of new entrants in science is above 20% of the total number of new entrants in Germany, the UK and in the Finnish Bachelor programs. Relatively few new entrants can be seen in the science programs in Flanders, the Netherlands and Sweden.
New lines in higher education

New entrants in natural science, universities, 1999

Compared with 1990, the number of new entrants in science has grown for Sweden, Flanders and the Danish Bachelor programs. A decrease can be seen for the UK and the Finnish Bachelor programs.
New lines in higher education

New entrants in technical sciences, universities, 1990

Compared to the number of new entrants in natural sciences, the situation in technical sciences is somewhat different; the percentage of new entrants is high in Austria, Finland, the Netherlands and Sweden. The lowest percentage of new entrants in technical sciences can, just as in natural sciences, be found in Flanders.
New lines in higher education

New entrants in technical sciences, universities, 1999

Compared to 1990, the number of new entrants in the technical sciences are decreased in Austria, Flanders, and Germany. The highest growth can be seen in Finland and Sweden. The percentage of the number of new entrants technical sciences in the UK in 1999, is the same as in 1990.
For the year 1990, the highest percentage of new entrants in the technical sciences can be found in Austria, Denmark (KVU) and Germany. This percentage is much lower in Denmark (MVU), Flanders and the Netherlands.
Compared to 1990, the percentage of new entrants decreased in all countries, especially in Austria, Denmark (MVU), Finland and Germany. In Flanders and the Netherlands, the decrease is modest.
New lines in higher education

Staff

Staff is the crucial input into the higher education processes. In this presentation we focus on three issues:

• Academic versus non-academic staff

• Academic staff by gender and rank

• Academic staff by age and rank

Notes

To return to the main list of issues, hit Esc.
Recent data on staff are not available for Denmark
Academic staff in higher education has grown strongly in France and Sweden. Austria and Flanders show also a significant growth in staff-numbers. In the remaining four countries, the changes have been far less significant.
The changes in the number of non-academic staff differ from the growth patterns of academic staff. **Finland** and **Austria** are the strongest growing countries, whereas in **Germany** and the **Netherlands** the size of non-academic staff hardly changes.
New lines in higher education

Female academic staff, as a percentage of total academic staff, 1999, in persons

Women are (still) a minority among academic staff. Female representation is highest in Flanders and worst in Austria.

Note
Dutch data in fte.
New lines in higher education

Female academic staff, as a percentage of total academic staff, in persons, 1995=100

Female representation has grown substantially in Flanders, Austria, the UK and Sweden. In the other countries a modest growth could be observed.
Female representation among university professors is far less than among academic staff in general. **The Netherlands, Flanders** and **Austria** score extremely low. **Finland** scores relatively high.
In all countries, except Flanders, there has been an increase in female representation. The growth was highest in the Netherlands, Austria (two countries scoring low in the previous graph) and Sweden.
New lines in higher education

Academic staff by age

The age-structure of academic staff is a policy issue in many countries. A substantial part of academic staff will retire in the next five to ten years. The replacement of this staff is a major concern to higher education policy makers in most countries.

The age-structure differs by country. In Austria, Flanders and Germany there are relatively many young staff members. In France, the structure is much more skewed towards the older age-groups.

In France, Germany, Sweden and Flemish universities the relative size of the old and young age-groups has grown. In the Netherlands, the UK and Flemish hogescholen, the older age-groups have grown.
New lines in higher education

Academic staff by age

Flanders universities

France

Germany
New lines in higher education

Academic staff by age

The Netherlands

Sweden

UK

1992 1999

1993 1999

1994 1999
New lines in higher education

Professors by age

The age-structure of the professoriate differs significantly from the age-structure of academic staff in general. On average, professors are significantly older.

Austria, France, Sweden and Germany have a relatively old professoriate. The proportion of ‘old’ professors in Finland and the UK is relatively small.

In Germany and Flanders the relative size of the old and young age-groups has grown. In Finland, France, the Netherlands, the UK and Sweden the older age-groups have grown.
New lines in higher education

Professors by age

Austria

Finland

1998

1996 1999
New lines in higher education

Professors by age

Flanders

France

Germany

1992 1998
1993 1999
1992 1999
New lines in higher education

Professors by age

The Netherlands

Sweden

UK

Information on changes in public expenditure on higher education is a major input in national discussions on higher education policies. A frequently used source for such information is the OECD-publication *Education at a Glance*. However, for our presentation *Education at a Glance* was not used, due to its limitation regarding trend analyses and timeliness. National statistics were used as the main datasource.

In describing public expenditure on higher education we distinguished two topics:

- Direct public expenditure on higher education
- Public expenditure on student grants and scholarships
New lines in higher education

Direct public expenditure on higher education institutions, 1993=100
New lines in higher education

Direct public expenditure on higher education institutions, 1993=100

In France and Germany there has been a modest growth of direct public expenditure on higher education in the second half of the 1990s. In the UK, there is a strong growth at the end of the period.

Public expenditure on higher education in Sweden, the Netherlands and Austria have grown at a modest rate.

Public expenditure on Finnish higher education shows a dip in the early 1990s. The subsequent increase is mainly due to the introduction of AMK. Danish expenditure has grown strong, whereas in Flanders, public expenditure has grown relatively slow.
New lines in higher education

Direct public expenditure on higher education institutions, as a percentage of GDP, 1993=100
New lines in higher education

Direct public expenditure on higher education institutions, as a percentage of GDP, 1993=100

In the second half of the 1990s, direct public expenditure (as a percentage of GDP) has decreased in the UK, Germany and France. The decrease in the UK and its stabilisation by the end of the period are remarkable.

Direct public expenditure on higher education have dramatically fallen in the Netherlands (in real terms). Sweden also shows a sharp drop in the second half of the period. Compared to these two countries, Austria does well on this indicator.

Finland and Denmark are the only countries in which direct public expenditure on higher education has grown (as a percentage of GDP). In Flanders a clear drop in public higher education expenditure could be seen. However, in the latest two years expenditure has stabilised at a higher level.
New lines in higher education

Public expenditure on student support, grants, as a percentage of GDP
New lines in higher education

*Public expenditure on student support, grants, as a percentage of GDP*

Public expenditure on student grants decreased in the UK and Germany. In France, the initial increase leveled off.

The number one position of the Netherlands in 1990 was vanished by the end of the period due to a steady decline (although in 1999, this trend seems halted). In Sweden public expenditure remained stable, and in Austria a limited growth can be observed.

Public expenditure on student grants was stable in Flanders and grew in Denmark. In Finland, expenditure grew rapidly till 1996 but dropped in the subsequent years.
New lines in higher education

Conclusion

The graphs presented show a rich and colourful picture of the major trends in the main statistical indicators. The information may be very relevant to higher education policymakers, who are more and more looking for an international positioning of their national higher education systems. The next step will be to relate the information on the various indicators to each other, in order to be able to assess ‘how well we are doing’ from an international perspective.

For more information on higher education policy trends and issues you may explore the CHEPS Website or contact us. Inquiries on more detailed statistical information (on a cost-recovery base) may be directed to Frans Kaiser.