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Evolution of Turkish Higher Education System in the Last Decade

Türk Yükseköğretim Sisteminin Son Onyıldaki Dönüşümü

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ABSTRACT

Turkey has witnessed a rapid massification in its higher education sector. The rate of total gross enrollment in Turkish higher education reached 79 percent in 2014 while it was 31 percent in 2004 and surpassed OECD averages. This study aims to depict the trends observed in the Turkish higher education sector. In this context, the changes observed in enrolment rates, faculty and student compositions, expenditures and publication outputs of Turkish higher education institutions during the last decade are discussed. In addition, a comparison with OECD averages are provided to understand the relative position of Turkey compared to other countries. Analyses have shown that Turkish higher education system performs very well in terms of higher education enrollment rates, female students, and female faculty members. Meanwhile, this study has revealed that Turkish higher education system needs to improve its performance in terms of quantity of faculty members, doctorate students, and international students, funds received from abroad, participation of private sector, and quantity and quality of scientific publications. It is considered that issues which are exacerbated with the rapid expansion of Turkish higher education system can be handled effectively via deploying a comprehensive database regarding Turkish higher education system, promoting data based policy making, determining clear and measurable targets with associated costs in the national policy documents, and establishing a performance evaluation system for universities.

Keywords: Higher education, Turkish universities, Turkish higher education sector, Higher education enrollment ratio

ÖZ

Türkiye yükseköğretim alanında hızlı bir kitleselleşmeye tanık olmaktadır. Türkiye'deki yükseköğretim okullaşma oranı 2004 yılında yüzde 31 iken 2014 yılında yüzde 79'a çıkmış ve OECD ortalamasını geçmiştir. Bu çalışma, Türk yükseköğretim sektöründeki eğilimleri ortaya koymayı amaçlamaktadır. Bu kapsamda, yükseköğretim okullaşma oranı, akademisyen ve öğrencilerin kompozisyonu, yükseköğretim harcamaları ve yayın çıktılarında son on yılda yaşanan eğilimler tartışılmaktadır. Buna ilaveten Türkiye'nin diğer ülkelere kıyasla durumunu ortaya koyabilmek adına OECD ortalamaları ile karşılaştırmalar yapılmıştır. Yapılan analizler, Türk yükseköğretim sisteminin okullaşma oranı, kız öğrencilerin oranı ve kadın öğretim üyelerinin oranı açısından oldukça iyi performans sergilediğini göstermektedir. Bununla birlikte öğretim üyesi sayısı, doktora öğrencisi sayısı, yabancı öğrenci sayısı, yurt dışından alınan fon miktarı, özel sektörün katılımı ile yayın sayısı ve kalitesi açısından iyileştirilmesi gerektiğini ortaya koymaktadır. Türk yükseköğretim sisteminde, kısa zamanda yaşanan genişlemenin de etkisiyle artan sorunların etkin bir şekilde çözülebilmesi açısından yükseköğretim sistemine ilişkin kapsamlı bir veri tabanının oluşturulmasının, veriye dayalı politikaların teşvik edilmesinin, yükseköğretim sistemine yönelik açık ve ölçülebilir hedeflerin maliyetleriyle birlikte ulusal politika dokümanlarına konulmasının ve üniversitelerin performanslarını değerlendirecek bir sistem kurulmasının fayda sağlayacağı düşünülmektedir.

Anahtar Sözcükler: Yükseköğretim, Türk üniversiteleri, Türk yükseköğretim sistemi, Yükseköğretim okullaşma oranı

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INTRODUCTION

The world economy is changing towards a system in which knowledge displaces the role of physical capital as the source of wealth creation. As knowledge becomes more significant, so does higher education. The quality of knowledge generated and transmitted within higher education system and its availability to the wider economy are very significant for boosting national competitiveness. Consequently, countries strive to enhance the performance of their higher education systems and a university degree has become a prerequisite for many skilled jobs (Worldbank, 2000). In addition, global concerns to enhance social equity necessiate the enlargement of higher education systems in several countries.

Expanding higher education has been among the policy targets of Turkish government for almost thirty years (Çetinsaya, 2014) but it went through an extraordinary expansion in terms of both its magnitude and geographic coverage especially after 2006 (Özoğlu et al., 2016). This rapid expansion has brought several concerns regarding the performance of the system in terms of its quality, qualification of graduates, research outputs, and contribution to the regional and national economy. The main issues of Turkish higher education system that were outlined in different academic studies can be listed as follows:

- Limited autonomy, accountability and flexibility of the universities (Çelik & Gür, 2014; Çetinsaya, 2014; Erdoğan, 2014; Kurt & Gümüş, 2014),
- Lack of data-based planning and policy development (Erdoğan, 2014; Günay & Özer; 2016; Özoğlu et al, 2016),
- Shortage in terms of qualified academic staff and high students per academic staff (Alkan, Suiçmez, Aydınkal & Şahin, 2014; Çetinsaya, 2014; Doğan, 2013; Erdoğan, 2014; Günay & Özer, 2016; Özoğlu et al, 2016),
- Insufficient level of funding and limited diversity of financial resources (Kurt&Gümüş, 2014; Özoğlu et al., 2016),
- Lack of physical and social infrastructure (Alkan et al., 2014; Doğan, 2013),
- Lack of collaboration between industry and academia (Alkan et al., 2014; Günay & Özer, 2016),
- Low levels of internationalization (Çetinsaya,2014; Erdoğan, 2014),
- Insufficient personnel benefits for academicians (Çetinsaya, 2014; Erdoğan, 2014; Günay & Özer; 2016),
- Difficulty in filling quotas especially in basic sciences and newly established public universities (Alkan et al., 2014; Günay, Günay & Atatekin, 2013; Özoğlu et al., 2016).

This paper aims to investigate the trends observed in the enrolment rates, faculty and student compositions, expenditures and publication outputs of Turkish higher education system in the last decade. A comparison with OECD country averages is provided to understand the relative position of Turkey compared to other countries. I believe analyzing Turkish higher education system from a 10-years macro perspective will provide useful insight to understand the dynamics of its structural change and help policy makers to come up with effective strategies in developing higher education policies.

METHOD

This study aims to depict the changes observed in the main constituents of the Turkish higher education sector during the last decade. In this context, enrolment rates, faculty and student compositions, expenditures and publication outputs of Turkish higher education institutions are analyzed. In addition, comparisons with OECD country averages are provided to understand the relative position of Turkey compared to other countries.

Data used in this study is derived from international organizations such as OECD, UNESCO and Worldbank, and national institutions such as Turkish Higher Education Council (YOK), Turkish Statistical Institute (TÜRKSTAT), and The Scientific and Technological Research Council of Turkey (TÜBİTAK).

FINDINGS

Changes in the Higher Education Enrollment

Between 2004 and 2013, the total enrollment in higher education increased from 58.6 percent to 70.2 percent in OECD countries. In Turkey, higher education enrollment increased more rapidly and surpassed the OECD average. It was 31 percent in 2004 and reached 79 percent in 2014 (Worldbank, 2016b).

In Turkey there are four types of higher education institutions (HEIs): Public universities, foundation universities, foundation vocational high schools that offer associate's degrees, and military HEIs. This study covers all Turkish HEIs, except military schools.

In Turkey, the number of universities increased from 73 in 2004 to 180 in 2014. The number of public universities which were 53 in 2004 became 104 in 2014. A more striking increase was observed in the number of foundation HEIs. In 2004 there were 20 foundation HEIs, all of which were foundation universities. In 2014, this number increased to 74 with eight foundation vocational high schools and 68 foundation universities.

As a result of the increased quotas in the HEIs, the percentage of today's young people expected to enter higher education increased to 70 percent for Turkey, which was higher than the OECD average of 67 percent in 2013 (OECD, 2015c). On the contrary, the percentage of today's young people expected to graduate with a bachelor's degree was 27 percent for Turkey, and this ratio is considerably lower than the OECD average of 36 percent (OECD, 2015c). From these two indicators, it can be inferred that although a higher ratio of young people is expected to enroll in a HEI in Turkey compared to OECD average, a higher proportion of these students are expected to drop out in Turkey compared to the OECD average. In other words, the expected dropout rates from higher education are higher in Turkey than the OECD average.

Parallel to the increase in the number of universities, the total number of university students, including the ones enrolled in open education, was almost tripled and reached approximately 6 million students in 2014 from approximately 2 million students in 2004. Table 1 provides information about the number and composition of university students in Turkey for the years of 2004 and 2014.

There are mainly four factors leading to this increase: (i) increased accessibility of HEIs, (ii) increased domestic demand for higher education, (iii) abolishment of the dismissal of unsuccessful students, (iv) increased quotas in open and distance education.

Increased accessibility of HEIs

The accessibility of HEIs has improved significantly in Turkey through both the enlargement of current universities and the establishment of new ones. Turkey followed an aggressive growth strategy between 2006 and 2008 and 41 new public universities were established in 41 provinces (Özoğlu et al., 2016). Those provinces did not previously host a public university rectorate but they had vocational high schools or faculties that were associated with other universities established in the neighborhood provinces. The proliferation of HEIs provided young people, who previously couldn't attend universities located in other provinces since they needed or preferred to stay in their hometown with the opportunity to continue their education.

In addition, several private foundation universities allowed less successful students to enroll in a university despite their low university entrance exam scores. In Turkey, students are placed in HEIs according to the score they receive from a central entrance examination. The placement is such a competitive process that in 2016 more than 2.2 million students took this test. Private universities that charge tuition fees generally have lower entrance scores compared to the public universities.

Another factor that enhanced the accessibility of higher education is the change in tuition policies. Starting from 2012-2013 academic year, no tuition fees are charged by the public universities for students who enroll in regular and open education programs.

Increased domestic demand for higher education

The demand for higher education is noticeably high in Turkey and it expected to stay high in the future. There are three factors stimulating this demand. First of all, having a higher education degree has become almost a prerequisite for having a skilled job and a higher social status in Turkey. Among OECD countries, Turkey has one of the highest earnings premium for higher education. As of 2013, people with higher education degree earned 88 percent more on average than the ones with upper secondary education, whereas the OECD average was 60 percent. The gap was more salient for women. In 2013, women with a university degree earned 111 percent more than those who graduated from the upper secondary schools. Meanwhile, OECD average was 63 percent (OECD, 2015b). Secondly, Turkey's demographic projections for the next 50 years indicate an increasing demand in higher education at least for the next 30 years (Çetinsaya, 2014). Thirdly, due to the extension of compulsory education to 12 years in 2012, the number of high-school graduates will increase significantly after 2016 and this will boost the demand for higher education (Çetinsaya, 2014).

Abolishment of the dismissal of unsuccessful students

As of February 2011, the dismissal of students from HEIs due to absenteeism or academic failure was repealed in Turkey, and the ones who were dismissed or left their school by their own will in the previous years were entitled to re-enroll in their former schools. This also contributed to higher education enrollment rates significantly.

Increased quotas in open and distance education

Another major contribution to higher education enrollment rates in Turkey is attributable to students who are enrolled in open education programs that offer a flexible mode of enrollment in a HEI. In open education programs, students are not required to physically attend to the classes, but they need to take tests after the completion of each academic semester. In Turkey, these tests are given in each province so that students do not need to travel for long distances.

The Higher Education Act issued in 1981, authorized Anadolu University as the national open education provider. Today, this open education system serves to both national and international students and it is among the world's largest open education bodies with its 2.6 million students[1]. Meanwhile, two more universities are also authorized to provide open education degrees, but as of now they enroll rather fewer number of students compared to Anadolu University. The total number of students enrolled in the open education programs increased by approximately 2.1 million from 2004 to 2014. The highest percentage increase among open education programs is observed in the total number of upper secondary education students with a 412 percent increase from 384 thousand in 2004 to 922 thousand in 2014.

Table 1 shows that 36 percent of students who enrolled in upper secondary education programs were registered in open education programs in 2004, whereas this ratio increased to 54 percent in 2014. Similarly, 36 percent of students who enrolled in undergraduate programs were registered in open education programs in 2004, and this ratio reached 47 percent in 2014. Eventually as of 2014, around half of the upper secondary education and undergraduate students have been registered in open education programs in Turkey.

Changes in the Composition of Students

Table 1 presents the changes in the gender composition of university students from 2004 to 2014. The ratio of female

[1]*The data is retrieved from Anadolu University's website, https://www.anadolu.edu.tr/universitemiz/sayilarla-universitemiz/ogrenci-sayilari/2015-2016-ogrenci-sayilari/eylul-2015, last visited in 03.05.2016*

students decreased by 1 percentage point in upper secondary education programs and 2 percentage points in master's programs, whereas it has increased by 8 percentage points in undergraduate programs, and 2 percentage points in doctorate and open education programs. Overall the ratio of female students in Turkish HEIs increased from 42 percent in 2004 to 46 percent in 2014. These figures imply that from the perspectives of female students, the accessibility of higher education has improved in Turkey.

Although the total number of foundation schools almost quadrupled from 2004 to 2014, the percentage of students registered in these HEIs was still low compared to the public universities. In 2004 1367305 students were registered in HEIs (except the ones in open education). Among those students only 93284 (7%) were registered in foundation HEIs. In 2014, among 3259822 university students (except the ones in open education) 447593 (14%) were enrolled in the foundation HEIs.

The distribution of tertiary students and graduates by their field of study in Turkey the years of 2002 and 2012 is given in

Table 1: Number and Composition of University Students

	2004	2014
Changes in number of students		
Total Number of University Students	**2062896**	**6062886**
Upper Secondary (Associate's Degree) Programs*	**384456**	**921611**
Undergraduate (Bachelor's Degree) Programs*	**862948**	**1917887**
Graduate Programs*	**119901**	**420324**
Master's degree programs	92566	342101
Doctorate degree programs	27335	78223
Open Education Programs	**695591**	**2803064**
Upper secondary education	213130	1092151
Undergraduate programs	482461	1710913
Changes in the composition degree programs		
Percentage of open education students in upper secondary education	36	54
Percentage of open education students in undergraduate programs	36	47
Ratio of doctorate students to masters students	0.30	0.23
Percentage of graduate students in higher education	6	7
Changes in the enrollment rates of foundation HEIs		
Number of foundation HEIs	20	76
Students enrolled in foundation HEIs	93284	447593
Percentage of students enrolled in foundation HEIs**	7	14
Changes in the gender composition of students		
Percentage of female students in upper secondary education*	40	39
Percentage of female students in undergraduate programs*	42	50
Percentage of female students in master's programs*	43	41
Percentage of female students in doctorate programs	40	42
Percentage of female students in open education programs	44	46
Percentage of female students in HEIs	42	46

Source: Compiled by the author from the Assessment Selection and Placement Center of Turkey (OSYM) and Turkish Higher Education Council (YOK) websites.
Note: These numbers do not cover military HEIs.
***:** Includes formal education, secondary education and distance education students.
****:** Open education students are not included.

Table 2. Over the last decade, the percentage of students in social sciences has decreased whereas percentage of students in other disciplines has increased. The highest percentage point increase was observed in the engineering sciences. Within the same period, the percentage of graduates in humanities and social sciences has decreased and the percentage of students in other disciplines has increased. The highest percentage point increase for graduates was realized in the education field.

In 2013, the OECD averages in terms of the percentage of graduates were 10 percent in education, 11 percent in humanities, 34 percent in social sciences, 9 percent in sciences, 14 percent in engineering, 2 percent in agriculture, 15 percent in health, and 5 percent in services. These figures reveal that compared to the OECD average, Turkey's higher education was relatively more concentrated on agriculture and social sciences and on the contrary relatively less concentrated on humanities and engineering. Meanwhile, the gap in terms of scientific fields between Turkey and OECD average got closer during the last decade.

The percentage of foreign students among tertiary students provides a representation of the internationalization of higher education. The number of foreign students enrolled in HEIs increased profoundly throughout the world during the last decade. In 2003, there were 2.12 million university students enrolled outside their country of origin and this number increased by 90 percent to over 4 million in 2013 (OECD, 2005b, 2015c).

Relative to a country's total higher education enrolment, the percentage of foreign students enrolled in OECD countries ranged from 0.3 percent (China) to 43.5 percent (Luxembourg) and with 1.1 percent foreign students, Turkey ranked second from the last row among 35 OECD countries in 2013 (OECD, 2015c). Meanwhile the ratio of foreign students in Turkey was 0.8 percent in 2003 which means that Turkey has improved its foreign students' intake performance during the last decade (OECD, 2005b) although it hasn't still caught up with other OECD countries.

The percentage of distribution of foreign students by the field of education in 2003 and 2013 for Turkey is given in Table 3. It is evident from the table that foreign students that came to Turkey mostly preferred to study social sciences. As of 2013, the percentage of foreign students in agriculture, education and sciences and services was less than 10 percent.

During the last decade, the percentage of foreign students in education, sciences, engineering, agriculture, health and services did not change significantly. On the other hand, the percentage of students enrolled in social sciences decreased saliently which was accompanied with an increase in humanities.

The number of graduate students is an indicator that provides information about the maturity and sophistication of the higher education system in a country. From 2004 to 2014, the number of students in both master's and doctorate degree programs has increased in Turkey. The percentage of graduate students among all university students increased from 6 percent in 2004 to 7 percent in 2014. On the other hand, the ratio of doctorate students to master's students decreased from 0.30 to 0.23 during the same period. These figures implied that the enlargement rate in the master's programs was relatively higher than that of doctorate programs.

The total number of master's students increased by 270 percent from 92566 in 2004 to 342101 in 2014. Nevertheless, a commensurate increase wasn't observed in the number of master's graduates. The total number of master's degree graduates increased 92 percent from 21747 in 2004 to 41842 in 2014. As a result, the ratio of these graduates to students in master's programs decreased almost by half from 0.23 in 2004 to 0.12 in 2014.

Table 2: Percentage Distribution of Tertiary Students and Graduates, by Field of Study

Scientific Field	2002		2012	
	Percentage of students	Percentage of graduates	Percentage of students	Percentage of graduates
Education	12.8	7.5	15.1	10.1
Humanities (humanities and arts)	5.7	9.6	7.0	8.5
Social sciences (social sciences, business ad law)	49.5	54.5	41.6	46.7
Sciences	7.3	7.0	7.7	8.6
Engineering (engineering, manufacturing and construction)	13.1	10.7	15.3	12.3
Agriculture	3.4	2.4	4.1	3.2
Health (health and welfare)	5.7	4.8	6.3	5.7
Services	2.4	3.5	3.0	4.9

Source: UNESCO Institute for Statistics

The total number of doctorate students in Turkey increased 145 percent from 27335 in 2004 to 67157 in 2014. In the meantime, the total number of graduates from doctorate degree programs increased 83 percent from 2664 to 4873. In other words, the rate of increase in the number of doctorate graduates was almost half of the rate of increase in the doctorate students.

In summary, the increases in the number of graduates from both master's and doctorate degree programs didn't keep up with the increases in the number of students in Turkey. The ratio of graduates to students was almost cut in half, especially after the abolishment of student dismissals from HEIs 2011. The ratio of graduates to students decreased continuously and in 2014 approximately one out of ten students could graduate from master's programs, and one out of 20 students could graduate from doctorate programs.

Graduates at doctorate level, by the field of education for Turkey and OECD countries average is given in Table 4. Accordingly, in humanities, social sciences, and services and agriculture fields, Turkey had higher ratios than the OECD average. The highest positive difference between Turkey and OECD average occurred in humanities. Meanwhile, in the fields of natural sciences, engineering, and health Turkey's ratios remained below the OECD average. The highest negative difference between Turkey and OECD average was seen in health sciences. In Turkey 11.4 percent of doctorate graduates were from health sciences, whereas this ratio was 19.5 percent for OECD average. Having lower ratios of doctorate graduates in the fields of natural sciences, engineering and health sciences might hinder R&D and innovation activities in Turkey because increasing specialization in these fields remain influential on a nation's competitiveness, economic growth, and overall standard of living (Langdon et al., 2011).

As of 2012, Natural Sciences and Engineering (NS&E) degrees accounted for about 22 percent of new doctorates in OECD countries. Turkey remained below the OECD average such that NS & E degrees constituted 18 percent of new doctorates (OECD, 2015a).

The share of new NS & E doctorates awarded to women was 43.8 percent in Turkey. With this ratio, Turkey ranked seventh among OECD countries after Luxembourg, Portugal, Italia, Estonia, Spain, and Israel (OECD, 2015a).

Another important issue in graduate programs is the ratio of international students, since one of the global trends in higher education systems is the internationalization of students and academic staff (Çetinsaya, 2014; OECD, 2015a).

On average 14 percent of students at the master's level and 24 percent of students at the doctoral level are international students in OECD countries in 2013. In Turkey, the ratio of international graduate students was considerably lower than most of the OECD countries in that 4 percent of students at the master's level and 4 percent of students at the doctorate level were international students (OECD, 2015c).

When we synthesize the figures on the number and composition of graduate students in Turkey we suggest that although the increasing number of graduate students implies that Turkish higher education system is maturing, low graduation rates and low percentage of international students indicate that there are some quality problems that need to be tackled.

Changes in the Composition of Academic Staff

In accordance with the enlargement of the higher education system, the total number of academic staff increased largely in Turkey. As it is presented in Table 5, the total number of academic staff which was 82096 in 2004 increased to 148903 in 2014.

The highest percentage increase was observed in the academic staff employed in the upper secondary education with 173 percent increase. During the last decade, both quantity and quotas of upper secondary education increased considerably in Turkey. Due to governmental policies, upper secondary education schools were opened in the districts with moderate to high population. New public universities (the ones that were established after 2006) preferred to open upper secondary education schools since the cost and time required to build them is less than that of faculty buildings. In addition, it is easier to recruit human resources for upper secondary education since supply of full-time and part time academic staff is more available than the supply of faculty members with academic titles.

The changes observed in the composition of academic staff are given in Table 6. In this table, those classified as "faculty members" consist of professors, associate professors and assistant professors; and those classified as "academic staff" consist of faculty members, instructors, specialists, research assistants, translators, and education and training planners.

The composition of the academic staff in Turkish HEIs evolved in three ways during the last decade. First, the number of professors as a percentage among faculty members decreased from 37 percent in 2004 to 31 percent in 2014. Second, the number of faculty members as a percentage among academic staff increased from 39 percent in 2004 to 46 percent in 2014. Third, the percentage of women among both faculty members and academic staff increased by 4-5 percentage points.

In terms of the ratio of students to academic staff indicator, Turkey has historically been performing worse than the OECD countries' average and the gap widened during the last decade. The ratio of students to teaching staff for all tertiary education institutions increased from 16.6 in 2003 to 22 in 2013 in Turkey. On the other hand, OECD countries' average was 14.9 in 2003 and increased to 16 in 2013 (OECD, 2005b, 2015c).

Considering the demand for higher education will continue to increase in Turkey, employing sufficient number of quality faculty members, who can perform research and training activities effectively, is necessary to establish and sustain a quality higher education system in Turkey (Çetinsaya, 2014).

On the other hand, as several studies pointed out (Çetinsaya, 2014, Günay and Özer, 2016), the increase in the number of academic staff wasn't compatible with the increase in the num-

Table 3: Percentage Distribution of Foreign Students in Turkey, by Field of Study

Scientific Field	2003	2013
Education	7	6
Humanities (humanities and arts)	7	13
Social sciences (social sciences, business ad law)	43	38
Sciences	8	9
Engineering (engineering, manufacturing and construction)	14	16
Agriculture	3	2
Health (health and welfare)	13	12
Services	5	5

Source: OECD (2005b, 2015c).

Table 4: Graduates at Doctorate Level, by Field of Education, 2012

	Natural Sciences	Engineering	Health	Humanities	Social Sciences	Services & Agriculture	Share of New NS&E Doctorates Awarded To Women
Turkey	22.7	13.9	11.4	24.2	21.0	6.8	43.8
OECD	25.1	14.9	19.5	18.3	18.0	4.2	34.4

Source: OECD (2015).

Note: Engineering field covers engineering, manufacturing and construction; health field covers health and welfare; humanities field covers humanities, arts and education; social sciences field covers social sciences, business and law.

Table 5: Number of Academic Staff

	2004-2005	2014-2015	% Increase
Total Number of Academic Staff	**82096**	**148903**	**81**
Upper Secondary Education	6483	17674	173
Undergraduate Programs	68299	126240	85
Graduate Schools and Institutes	4446	4955	11
Research Centers	327	34	-90
Students per Academic Staff	**25**	**41**	**62**

Source: Compiled by the author from the Assessment Selection and Placement Center of Turkey (OSYM) and Turkish Higher Education Council (YOK) websites.

Note: These numbers included academic personnel from public universities, foundation universities and foundation vocational training schools. Those classified as "academic staff" consist of faculty members, instructors, specialists, research assistants, translators and education and training planners.

Table 6: Change in Terms of Faculty Composition

Academic year	Professors as a percentage of faculty members	Faculty members as a percentage of academic staff	Percentage of women among faculty members	Percentage of women among academic staff
2004-2005	37%	39%	30%	39%
2014-2015	31%	46%	35%	43%

Source: Author's calculations being based on data from Assessment Selection and Placement Center (OSYM) and Higher Education Council (YOK) websites.

ber of university students. Ultimately, student per academic staff (including open education) increased from 25 in 2004 to 41 in 2014 and this accounted for a 62 percent increase. Except for open education students, the ratio of students to a faculty member was 41.2, and students per academic staff was 19.4 in 2014 (Kalkınma Bakanlığı, 2016). Higher ratios of students per faculty member led to increased teaching load of faculty members, decreased quality of the education and remarkable reduction of time that can be allocated for the research activities.

The percentage of students per faculty member (excluding open education) was 49.2 in public universities, 39.1 in foundation universities, and 398.9 in foundation vocational high schools in 2014. One of the factors that caused the extremely high values in foundation vocational high schools might be that these schools preferred to recruit either part-time teaching staff or teaching staff without any academic titles. On the other hand, the differences in the percentage of students per academic staff (excluding open education) were lower across different university types. It was 22.2 in public universities, 20.2 for foundation universities, and 23.9 for foundation vocational high schools (YOK, 2016). An upward trend in the percentage of students per academic staff together with the decreasing ratio of professors among faculty members raises questions regarding Turkish higher education quality.

Trends in the Higher Education Expenditures

Spending on higher education is shaped by factors such as the age structure of the population, enrolment rates and salaries of teaching staff. Expenditures in higher education in OECD countries reached 1.63 percent of GDP in 2011 as compared to 1.30 percent in 2000. In Turkey, despite of the big share of young population and increasing tertiary enrolment rates, this share remained below the OECD average with 0.77 percent in 2000 and 1.32 percent in 2011 (OECD, 2015a).

HEIs in OECD countries are mainly publicly funded, but there are substantial and growing levels of private funding. In 2002 the share of public spending in higher education spending was 76.1 percent for OECD average and 90.1 percent for Turkey (OECD, 2005b). In 2012, on average 69.7 percent of higher education spending was performed by public sector in OECD region while this ratio was still higher in Turkey than the OECD average with 80.4 percent (OECD, 2015c). Governments used to heavily subsidize higher education expenditures for public universities in Turkey. Tuition fees constituted only a small portion of university revenues in that they accounted for approximately 5 percent of university revenues between 2000 and 2005 (YOK, 2005). Since 2012-2013 academic year, no tuition fees have been charged by the public universities for students who enroll in regular morning programs and open education programs. Meanwhile tuition fees are still valid for students who have not graduated from a program within the theoretical duration or students who enroll in distant educa- tion, evening programs and foundation universities.

During the last decade, the expenditure per student increased in most of the OECD countries at the higher education level. But the expenditure per university student as a percentage of per capita GDP followed a decreasing pattern. On average, the expen- diture per tertiary student (in equivalent US dollars converted using PPPs) in OECD region increased from $ 13343 in 2003 to $ 15028 in 2013. In Turkey, the expenditure per university student (in equivalent US dollars converted using PPPs) was $ 7779 in 2012 and Turkey ranked fourth from the last row in terms of this indicator (OECD, 2014, 2015c). Unfortunately, in terms of the expenditure per tertiary student indicator, no information is available for Turkey for the previous years.

For the OECD as a whole, the expenditure per university student as a percentage of per capita GDP was 43 percent in 2002 and decreased to 40 percent in 2012 (OECD, 2005b, 2015c). The decrease occurred because the enrolments have increased faster than expenditures since the beginning of the economic crisis in 2008 (OECD, 2015c). In Turkey, the expenditure per university student as a percentage of per capita GDP decreased more than OECD average from 58.7 percent in 2004 to 43.0 percent in 2012. This phenomenon occurred mainly due to the strong economic growth of Turkish economy during which GDP per capita increased faster than higher education expenditures in Turkey.

The share of R&D spending in higher education expenditures is an important financial indicator as HEIs are becoming more involved in research and development activities. The share of R&D spending depends on both total R&D expenditure of the country and national R&D infrastructure capacity.

The R&D intensity (GERD) of the OECD area increased from 2.1 percent of GDP in 2003 to 2.4 percent in 2013 and total higher education expenditure on R&D (HERD) increased from 0.37 percent in 2003 to 0.45 percent in 2013 (OECD, 2015a). The enhanced funding opportunity for research activities of higher education institutions bolstered the capacity development in terms of research infrastructures. Consequently, the share of R&D expenditures among higher education expenditures gradually increased over the last decade in OECD countries. On average in OECD countries, the share of R&D expenditures represented 25 percent of all tertiary education expenditures in 2003 and this ratio increased to 32 percent in 2013 (OECD, 2005a, 2015c).

In Turkey GERD increased from 0.72 percent in 2003 to 0.95 percent in 2013 (TUBITAK, 2016) and HERD increased from 0.32 percent in 2003 to 0.40 percent in 2013 (OECD, 2015a). Unfortunately, the share of R&D expenditures among higher education expenditures is not available for Turkey. But since the percentage increase between 2003 and 2013 was higher for Turkey in terms of both GERD and HERD than the OECD aver- age, we anticipate that the share of R&D expenditures among higher education expenditures followed an increasing trend in Turkey during the last decade.

The largest share of HERD is financed through government funds with 78.1 percent of the total resources in Turkey. In the meantime, the share of HERD financed by business enterprises and private non-profit organizations decreased from 28.3 percent in 2000 to 21.5 percent in 2013. Despite this decline,

Turkey still ranked third among OECD countries, after China (33.8%) and Russia (28.3%) in 2013 (OECD, 2015a).

In 2013, the share of HERD financed by funds from abroad, including international organizations was 0.4 percent in Turkey and represented an insignificant source of R&D for Turkish universities. As a matter of fact, Turkey ranked second to the last among OECD countries, before Japan (0.1%) (OECD, 2015a).

Changes in the Publication Performance

The number of publications is a frequently used indicator to measure research productivity and international journal databases. For instance, Scopus and Web of Science (WoS) have been the most frequently used databases to derive bibliographic information.

During the last decade, the intensity of publication output increased in the majority of the OECD countries. Over 2003-12 the United States led the production of scientific publications with approximately 5 million publications and Turkey ranked 19th among OECD countries with its 257 thousand publications (OECD, 2015a).

In Turkey, both the number of total publications and publications per million population followed an increasing trend during the last decade. The total number of WoS indexed publications from Turkey which was 13341 in 2004 reached 27276 in 2014. Similarly, the number of publication per million population which was 197 in 2004 was raised to 351 in 2014. Turkey has been ranked in the top 20 countries in terms of total publication since 2004. On the other hand, its rank in terms of publications per million population fell back and regressed to being between 44th and 45th during the last decade.

The percentage of publications among 10 percent most cited publications is used as a "quality adjusted" measure of research out-put. OECD (2015a) determined the share of 10 percent most cited publications after making field-based normalizations for the period between 2003 and 2012. Accordingly, Switzerland had the largest share of highly cited publications (19.4%), followed by the Netherlands (19.2%) and Denmark (18.8%). Meanwhile, only 6.9 percent of publications from Turkey were among 10 percent most cited publications, and Turkey ranked seventh from the bottom among OECD countries.

OECD (2015a) calculated a relative activity index to identify fields in which a given country accounted for a relatively high share of scientific production compared to the global norm for the period between 2003 and 2012. Accordingly, Turkey was found to be specialized in dentistry and veterinary. OECD (2015a) also developed a new indicator that showed the fields in which scientists in each country attained the largest fraction of publications featuring among each field's 10 percent globally most-cited documents. Top fields in Turkey were found as energy, chemical engineering, and engineering. Meanwhile, in the most specialized fields, which were veterinary and dentistry, Turkish researchers could not attain any levels of excellence.

Turkish Academic Network and Information Center (ULAKBIM) prepared a study called "Publication Performance of Turkish Universities: 2004-14" using WoS database. According to this study, Turkish universities published more articles in medical, basic and engineering sciences compared to other scientific fields. In terms of the impact factor of publications, Turkish universities performed better than the world average in only 17 subfields[2] out of 250 subfields. This indicates that Turkish universities need to improve both the quality and the visibility of their publications.

Issuing a certain number of academic publications in international and national peer-reviewed journals is among the academic promotion criteria in Turkey. Current regulation puts compulsory minimum limits on the number of publications, but there isn't any obligation that urges to receive minimum number of citations. Starting from October 2016 receiving certain number of citations will be a prerequisite for receiving an associate professor title. Through exerting this minimum citation criteria, YOK aims to enhance the excellence and visibility of publications written in Turkish HEIs.

DISCUSSION and CONCLUSIONS

As of 2014, Turkey has been among the largest upper middle-income countries with a Gross Domestic Product (GDP) of $ 799.54 billion and it is the 17th largest economy in the world. Per capita income in Turkey has nearly tripled between 2000 and 2012 and increased from $4215 to $10646. On the other hand, eco- nomic growth has slowed down since 2012 and it decreased to 4.2 percent in 2013 and 2.9 percent in 2014 (Worldbank, 2016a). To attain a sustainable economic growth, Turkey needs to enhance its human resources, research and innovation capacity and in this respect, boosting the performance of HEIs is truly important.

Expanding higher education has been among the policy targets of Turkish government for almost thirty years (Çetinsaya, 2014) but it went through a massive expansion after 2006. This rapid expansion brought about several concerns regarding the overall performance of Turkish higher education system.

This study aimed to understand the changes observed in the main constituents of the Turkish higher education sector during the last decade from a macro perspective. The main findings and relevant policy implications can be summarized as follows:

Turkish higher education is in transition along several dimensions such as enrollment rates, faculty and student compositions, expenditure schemes, and research outputs. Some of these transitions such as increased share of female students and female academicians and increased higher education

[2]*These subfields are: Integrative and Complementary Medicine, Medical Laboratory Technology, Nuclear Physics, Applied Chemistry, Thermodynamic, Mechanics, Instrumentation, Water Resources, Transportation, Environmental Engineering, Energy and Fuels, Construction Engineering, Chemical Engineering, Biologic Psychology, Operations Research and Management Science, Hospitality Leisure, Sport and Tourism, and Agricultural Engineering.*

enrollment rates reveal positive developments regarding Turkish higher education system.

For some indicators, we see that although the performance of Turkish higher education has enhanced considerably in the last decade, it still remains behind the OECD averages. These indicators are: Percentage of foreign students among tertiary education students, percentage of students and graduates from engineering and science departments, expenditures in higher education as a percentage of GDP, the share of private sector in higher education expenditures, spending per higher education student, share of students enrolled in the foundation universities, and publications per million population.

For other indicators, we see that the performance of Turkish higher education has been worsening. These indicators are: Students per faculty member, professors as a percentage of faculty members, and graduates as a percentage of students in the graduate programs.

Consistent with the previous studies, this study reveals issues associated with the faculty shortages (Alkan et al., 2014; Çetinsaya, 2014; Doğan, 2013; Erdoğan, 2014; Günay & Özer, 2016; Özoğlu et al, 2016). Employing sufficient number of qualified faculty members has upmost importance to guarantee the sustainability and competitiveness of a higher education system. Consequently, we suggest performing long-term human resources projections for Turkish higher education and taking necessary measures to train and employ prospective faculty members. As Çetinsaya (2014), Erdoğan (2014), and Günay and Özer (2016) suggested, enhancing personnel benefits for academicians might increase the demand for becoming a faculty member among qualified students. In addition, the programs that support training of prospective faculty members such as Faculty Member Training Program (ÖYP) which is being implemented by YOK, and scholarships that are given by TÜBİTAK, YOK and Ministry of Education should be planned in coordination with each other to satisfy the future demand for faculty members. Finally, as Çetinsaya (2014) has pointed out and our findings support, the total number of doctorate graduates is lower in Turkey compared to the other developed countries with similar population. Thus it is important to take necessary measures to increase the number of doctorate students and lower the drop-out rates. In this context, increasing employment and scholarship opportunities for doctorate students might raise the demand for graduate programs.

Similar to the findings of the previous studies (Kurt & Gümüş, 2014; Özoğlu et al, 2016) this study points out insufficient level and schemes of funding for higher education in Turkey. Our findings suggest that Turkish higher education needs to improve its financials specifically in terms of the share of private sector and funds received from abroad. As Kurt and Gümüş (2014) suggested, financial resources allocated for higher education can also be diversified through entrepreneurship activities, donations, and trust funds.

This study corroborates the findings of Çetinsaya (2014) and Erdoğan (2014) who state that there is low level of internationalization in Turkish higher education. Increasing the overall quality of education and research activities in universities, extending the coverage of student and faculty mobility programs such as Erasmus and Mevlana, establishing multinational universities both in Turkey and in other countries, opening more undergraduate and graduate programs whose medium is English, and effective promotion of Turkish higher education globally might contribute to the further internationalization of Turkish higher education.

As Çetinsaya (2014) expresses, our findings also indicate that Turkish higher education should enhance its performance in terms of both quantity and quality of scientific publications. Tekneci (2014), finds that the number of doctorate students per faculty member, availability of academic support personnel, and amount of external research funds have significantly positive impact on the publications per faculty and citations per faculty. Consequently, we suggest enlarging doctorate programs, enhancing support services for faculty members, and motivating faculty members to involve more in research projects to boost publication and citation performance of Turkish higher education. In addition, establishing research support offices that will be in charge for helping researchers to establish academic networks and providing editorial support might be helpful.

To sum up, the massification of the Turkish higher education during the last decade increased higher education opportunities for the citizens but it also brought about several problems regarding the planning, organization, resource management and financing of the system. To foster more competitive HEIs, these problems should be tackled systematically.

In this respect, first of all policy makers should have sufficient and reliable data on different parameters of higher education system. Data based planning and policy development is crucial for timely and cost-effective interventions in countries that are witnessing a crucial expansion in their higher education. On the other hand, several academic studies pointed out the lack of comprehensive data on Turkish higher education system (Erdoğan, 2014; Günay & Özer; 2016; Özoğlu et al, 2016). In this context, we recommend YOK and other relevant public institutes to conduct studies on current status, issues, trends, and expectations regarding Turkish higher education and collect data that is internationally comparable.

Secondly, clear and measurable targets regarding a better higher education system should be articulated in national higher education policy documents such as government programs, five-year development plans and annual programs. In addition, the related financial costs of these targets should be integrated in the policy documents to enhance the transparency and efficiency of future higher education funds.

Thirdly, we suggest deploying a national performance evaluation system which will periodically measure performance and development of universities over a wide-ranging set of activities from teaching to research activities and even to their contributions to society. Evaluation results may lead to a repositioning of policies and programs and shape the allocation of public funding.

This study has a number of limitations since it is performed based solely on macro-level quantitative data. On the other hand, different HEIs might have different problems or severity of the problems might differ among HEIs. For this reason, further research should incorporate qualitative data to understand the urgency and severity of the problems across different type of HEIs.

REFERENCES

Alkan, R.M., Suiçmez, M., Aydınkal M. & Şahin, M. (2014) Meslek yüksekokullarındaki mevcut durum: Sorunlar ve bazı çözüm önerileri, *Yükseköğretim ve Bilim Dergisi*, *4*(3), 133-140.

Çelik, Z. & Gür, B.S. (2014). Yükseköğretim sistemlerinin yönetimi ve üniversite özerkliği: küresel eğilimler ve Türkiye örneği, *Yükseköğretim ve Bilim Dergisi*, *4*(1), 18–27.

Çetinsaya, G. (2014). *Büyüme, kalite, uluslararasılaşma: Türkiye yükseköğretimi için bir yol haritası*, Eskişehir: Yüksek Öğretim Kurulu. Retrieved from https://yolharitasi.yok.gov.tr/docs/YolHaritasi.pdf

Deloitte. (n.d). *Making the grade 2015: The key issues facing the UK higher education sector,* Retrieved from http://www2.deloitte.com/content/dam/Deloitte/uk/Documents/public-sector/deloitte-uk-making-the-grade-2015.pdf

Doğan, D. (2013). Yeni kurulan üniversitelerin sorunları ve çözüm önerileri, *Yükseköğretim ve Bilim Dergisi*, *3*(2), 108–116.

Erdoğan, A. (2014). Türkiye'de yükseköğretimin gündemi için politika önerisi, *Yükseköğretim ve Bilim Dergisi*, *4*(1), 1-17.

Günay, D., Günay, A., & Atatekin E. (2013). Türkiye'de temel bilimlerde sarsılış: Ülkenin sarsılışı, *Yükseköğretim ve Bilim Dergisi*, *3*(2), 85–96.

Günay, D., & Özer, M. (2016). Türkiye'de meslek yüksekokullarının 2000'li yıllardaki gelişimi ve mevcut zorluklar, *Yükseköğretim ve Bilim Dergisi*, *6*(1), 1–12.

Kalkınma Bakanlığı. (2016). *2016 yılı programı* [2016 annual program], Ankara.

Kurt, T. & Gümüş, T. (2015). Dünyada yükseköğretimin finansmanina ilişkin eğilimler ve Türkiye için öneriler, *Yükseköğretim ve Bilim Dergisi*, *5*(1), 14-26.

Langdon, D., McKittrick, G.,Beede, D., Khan, B. & Doms, M. (2011). *STEM: Good jobs now and for the future*. U.S. Department of Commerce, Economics and Statistics Administration. ESA Issue Brief, #03–11. Retrieved from http://www.esa.doc.gov/sites/default/files/stemfinalyjuly14_1.pdf

OECD. (2005a). *OECD Science, technology and industry scoreboard 2005*, Paris: OECD Publishing

OECD. (2005b). *Education at a glance 2005: OECD indicators.* Paris: OECD Publishing

OECD. (2007). *Education at a glance 2007: OECD indicators.* Paris: OECD Publishing

OECD. (2008). *Education at a glance 2008: OECD indicators.* Paris: OECD Publishing

OECD. (2014). *Education at a glance 2014: OECD indicators.* Paris: OECD Publishing

OECD. (2015a). *OECD Science, technology and industry scoreboard 2015: Innovation for growth and society.* Paris: OECD Publishing

OECD. (2015b). "Turkey", in *education at a glance 2015: OECD indicators*, Paris: OECD Publishing. doi:10.1787/eag-2015-84-en

OECD. (2015c). *Education at a glance 2015: OECD indicators.* Paris: OECD Publishing

Özoğlu M., Gür, B.S. & Gümüs, S. (2016). Rapid expansion of higher education in Turkey: The challenges of recently established public universities (2006-2013). *Higher Education Policy*, *29*(1), 21-39.

Tekneci, P.D. (2014). *Evaluating research performance of Turkish universities*, Unpublished Phd Thesis, Middle East Technical University, Ankara, Turkey

TUBITAK (The Scientific and Technological Research Council Of Turkey). (2016). *Ar-Ge harcamalarının GSYİH'ye oranı* [Ratio of R&D expenditures to GDP], Retrieved from http://www.tubitak.gov.tr/sites/default/files/bty01_0.pdf

Turkish Higher Education Council (YOK). (2005). *Türk yükseköğretiminin bugünkü durumu* [Current status of Turkish higher education]. Retrieved from http://www.yok.gov.tr/documents/10279/30217/turk_yuksekogretimin_bugunku_durumu_kasim_2005.pdf/eec6a5a4-c0ee-4bca-ac3c-735dda4199cf .

Turkish Higher Education Council (YOK). (2016) *2014-2015 öğretim yılı yükseköğretim istatistikleri [2014-2015 Academic Year Higher Education Statistics]*. Retrieved from https://istatistik.yok.gov.tr/

TURKSTAT (Turkish Statistical Institute). (2015). *Araştırma-geliştirme faaliyetleri araştırması, 2014* [Research and Development Activities Research, 2014], Retrieved from http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18661

ULAKBIM (Turkish Academic Network and Information Center). (2015). *Bibliyometrik analiz [Bibliometric Analyses]*, Retrieved from http://cabim.ulakbim.gov.tr/bibliyometrik-analiz/isi-wos-turkiye-adresli-veriler/

UNESCO (2009). *Trends in Global Higher Education: Tracking an Academic Revolution*, Retrieved from http://www.uis.unesco.org/Library/Documents/trends-global-higher-education-2009-world-conference-en.pdf

Worldbank. (2000). *Higher education in developing countries: Peril and promise,* Retrieved from http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079956815/peril_promise_en.pdf

Worldbank. (2016a). *GDP per capita (current US$)* [data set]. Retrieved from http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?page=1

Worldbank. (2016b). *Gross enrolment ratio, tertiary, both sexes (%)* [data set]. Retrieved from http://data.worldbank.org/indicator/SE.TER.ENRR