



Robert Schuman

Miami-Florida European Union Center of Excellence

Comparative Regional Perspectives: The Bologna Process and Higher Education Attainment

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**Vol. 13 No. 11
August 2013**

Published with the support of the European Commission

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Comparative Regional Perspectives: The Bologna Process and Higher Education Attainment

by Beverly Barrett*

Since 1999, countries have voluntarily chosen to reform their higher education systems to join the European Higher Education Area. This paper compares Bologna Process implementation across four regions within the European Union. While there are 47 countries participating in the Bologna Process, this paper uses statistical analysis to consider 25 of the 28 EU Member States. The time period of analysis is 2000-2011, prior to Croatia's accession to the EU on 1 July 2013. Across Europe there are inter-regional differences in how the Bologna Process has been implemented and in the political economy contexts that influence higher education reform for policy convergence. There are three explanatory variables in the political economy context:

1. competitive economic pressures and globalization
2. domestic politics at the national level
3. leadership from the supranational European Union that socially constructs regional norms

Tertiary education attainment is the dependent variable of interest in this research. The objective of 40%, for 30-34 year olds, is Europe 2020 benchmark target. There are additional higher education reform criteria encompassed in the Bologna Process. These criteria concern Credit and Degree Structure, Quality Assurance, and Recognition of academic degrees among countries in the EHEA. This tertiary education attainment variable, which is of interest in this paper, does not capture the entire implementation process. Nevertheless, it is a measure of one important indicator of success in providing higher education access to populations within the context of democratic governance. This research finds that statistically GDP Per Capita is the most significant variable in relationship to tertiary education attainment across four regional areas in the European Union.

Europe 2020: Tertiary Education in the EU

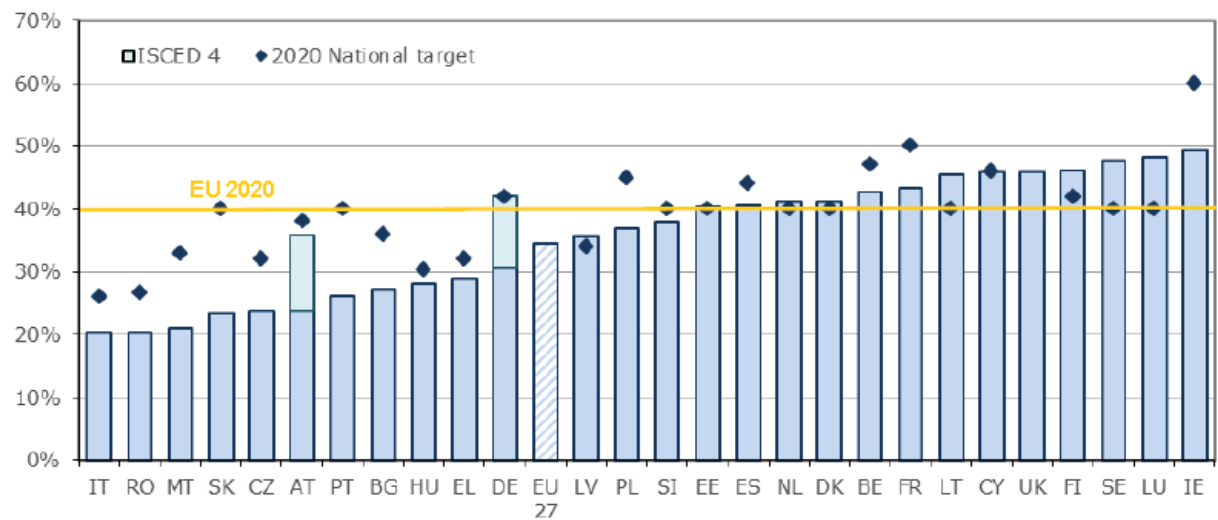
This research analyses the influences of the political economy on tertiary education attainment in particular. In light of the Europe 2020 target of 40 percent, for 30-34 year olds, and the higher education reform of the Bologna Process. Education is one of the five core areas of the EU's economic growth strategy Europe 2020. The other four core areas are employment,

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innovation, social cohesion, and climate sustainability to drive economic growth. There exists a dynamic policy space among three levels of institutional governance: supranational, national, and sub-national corresponding to the university. The successes and challenges of the Bologna Process thus far find explanations through understanding the influences of the political economy on policy implementation, which varies regions within Europe.

Europe 2020, the EU's economic growth strategy, is a continuation of the Lisbon Strategy that began in 2000. Europe 2020 was announced in March 2010. It is implemented with the Open Market of Coordination (OMC) mechanism for sharing best practices in soft policy areas. The Bologna Process, which originated in 1998 in Sorbonne with four Member States countries (France, Germany, Italy, and United Kingdom), is not an EU initiative. The European Commission is a partner alongside the 47 participating countries in the EU. The Bologna Process started in 1999 with 29 countries and has grown to 47 countries today.

Figure 1. Tertiary attainment level (%), 2011



Source: Eurostat (Labour Force Survey). Note: The lighter blue parts for Austria and Germany denotes inclusion of postsecondary attainment (ISCED 4).

National targets (minimum) for 2020 (%), source NRP

IT	RO	MT	SK	CZ	AT	PT	BG	HU	EL	DE	EU27	LV	PL	SI	EE	ES	NL	DK	BE	FR	LT	CY	UK	FI	SE	LU	IE
26	26	33	40	32	38	40	36	30.3	32	42	40	34	45	40	40	44	40	40	47	50	40	46	-	42	40	66	60

Figure 1. Tertiary education attainment level or equivalent, ages 30-34 %, 2011. Source: European Commission. 2012. Staff Working Document SWD (2012) 373 final. Communication from the Commission. Rethinking education: investing in skills for better socio-economic outcomes. 20 November 2012, p. 21.

Domestic politics and diplomacy interact in two-level games (Putnam 1988). As applied to EU soft policy negotiations, the “win-set” is the area of agreement where countries cooperate implementing the Open Method of Coordination (OMC). The OMC is used to coordinate soft law policies, meaning those that are not bound by a treaty of the European Union. The OMC is a mechanism for coordinating soft law policies - like higher education, employment, and environmental policies – in the EU. The soft law policies in higher education have become established overtime in periodic EHEA Ministerial Conferences. The European Commission’s economic growth strategy, Europe 2020, was announced in March 2010.

The Europe 2020 strategy is about delivering growth that is: [smart](#), through more effective investments in education, research and innovation; [sustainable](#), thanks to a decisive move towards a low-carbon economy; and [inclusive](#), with a strong emphasis on job creation and poverty reduction. The strategy is focused on five ambitious goals in the areas of employment, innovation, education, poverty reduction and climate/energy. To ensure that the Europe 2020 strategy delivers, a strong and effective system of [economic governance](#) has been set up to coordinate policy actions between the EU and national levels (European Commission 2013).

Historical Institutional Theoretical Perspective

Education policy represents a synthesis of sociological and rational factors, and historical institutionalism is where there is a fusion of the cultural and calculus approaches is found (Hall and Taylor 1996). The calculus approach is strongest in the rational institutional perspective, and the cultural approach is strongest in the sociological institutional perspective, between which historical institutionalism is an intermediary. Historical institutionalism serves as a bridge between rational and sociological institutionalism (Hall 2010 and Pierson 1996, 2004). Located in between rational and sociological explanations, historical institutionalism rests on notions of path dependency, that past behaviors set current behavior on a guided trajectory. This perspective has an explanatory capacity in comparative analysis of institutions over time.

Situated in between rational institutionalism and sociological institutionalism, a perspective of historical institutionalism derives insights from regional integration and intergovernmentalism to explain advancements in and resistance to policy change that takes place over time (Pierson 1996, 2004). A tenet of the Bologna Process is to give autonomy to the university institutions. The intended consequence is to create more transparency. In some cases this has led to confusion as countries have decentralized decision-making processes on granting university degrees (Amaral 2013). The institutions have been given autonomy to decide degree programs, which traditionally were decided by the state Ministries of Education. There are many degree programs that have become devised in response to the Bologna Process. The essential aspects are conforming to the ECTS (European Credit & Transfer System) and the three-cycle degree structure (bachelor+master+doctorate). Particularly in France, Germany, Italy, and Spain, there has been tension in state government and university institutional relations. France, Germany, and Italy, together with the United Kingdom, were the countries that committed to the

Sorbonne Declaration in 1998, which preceded the Bologna Process by one year. Regions vary in history and culture, and there are various state-institutional traditions over history.

Historical institutionalism is important to explain trajectory of higher education institutions in various regions. This theoretical framework offers insights into path dependence of institutions and of countries (Pierson 1996, 2004). The motto of the European Union “unity in diversity” is at the heart of the Bologna Process’ impetus for policy coordination. The objective is for higher education to complement the people and labor mobility in the common market through implementing the criteria of the Bologna Process. Recognizing that there have been various social models across Europe that are particular to regions - such as Anglo-Saxon, Continental, Mediterranean, Central and Eastern European, and Scandinavian– there are various corresponding traditions in higher education. Some regions such as Central and Eastern Europe have recently transformed their state administration after the fall of communism. As they enter the EHEA they are more market-oriented compared to countries where the university traditions are slower to change. A university legacy of Alexander von Humboldt embraces his 19th century value for scientific exploration, and that continues to inspire universities that are traditionally oriented and some that are market oriented as well. Some scholars raise concerns about neoliberal initiatives in higher that give too much concern to the pressures of globalization and the international economy, which may be weakening the social contract between governments and citizens in Europe (Dale and Robertson 2009).

European regional economic integration, the political economy of states, and socioeconomic cohesion are in a symbiotic relationship with the implementation of the higher education initiative of the Bologna Process. Under the governance leadership of the EU, which has led the world in regional integration in modern history, the educational and cultural dimension is a new frontier for the Europeanization of policies that were previously state-directed. Being a voluntary initiative, there are no penalties imposed for noncompliance to the higher education standards in the EHEA. Therefore, it is remarkable to consider that countries have undertaken comprehensive measures to reform their national policies and their higher education institutions without a strong accountability mechanism. Some scholars argue that the absence of accountability through binding political mechanisms weakens the viability of the initiatives (Veiga and Amaral 2009).

In the Bologna Process, several countries are policy-makers and most others are policy-takers. Even though most countries are policy-takers, there is willingness to be part of the Bologna Process since it is better to be part of the group than left out of the group, given the participation of most countries in Europe. This is evidence of the perceived utility that countries gain from membership in an excludable goods network (Kölliker 2001). After all, the initiative started with four leading countries in Europe – France, Italy, Germany, and the United Kingdom – at the Sorbonne in 1998. Some countries in the region may aim to implement policies to gain favor with the EU and to benefit in an economic and political relationship of resource dependency in the region. Other motivations stem from considerations that the reforms will

enhance economic growth as part of a regional strategy or reputational motivations to be aligned with a regional cooperation initiative supported by the EU.

Research Question and Methods:

A combination of quantitative and qualitative analysis is important to capture a complete understanding of policy implementation. Statistical data from Eurostat and the World Bank serve to provide indicators regarding the economy and education. Qualitative analysis is cursory in this paper, and it is useful in extended discussions. Process tracing causal chains over time reveals sequences of events that are explanatory factors (Pierson 2004:87). In this analysis, the dependent variable of interest is the specific higher education reform criteria of tertiary education completion. The historical institutional perspective informs path dependency (Pierson 2004, 1996). This informs the hypothesis that political economy macroeconomic conditions influence education outcomes within countries and regions.

Research Question: What are the political and economic explanations for achieving the criteria of tertiary education completion, as part of higher education reform in the Bologna Process?

Hypothesis: If there are positive macroeconomic indicators, then educational reforms will correspond positively on a path dependent trajectory.

Regression Model:

Tertiary education attainment = a + b1(Govt spending Ed) + b2(Investment in R&D) + b3(Trade/GDP) + b4(Employment) + b5(GDP per capita) + b6(Population)

This research uses national level panel data over 12 years, 2000-2011 for a time-series regression. There are four regional regression models using the appropriate regional interaction term with each of the six independent variables. The regression models apply four categories of dummy variables to control for regional-level differences.

The 6 Independent Variables:

The dependent variable of Tertiary Education Attainment is regressed on the observations from the six independent and control variables:

1. Education Spending as percent of GDP
2. Investment in R&D as percent of GDP
3. Trade/GDP as a measure of economic integration
4. Employment as percentage of population
5. GDP per capita
6. Population

These independent variables were selected given their frequency of reference in literature on education policy and reform. Concerning education spending, a rationale of the Bologna Process was to save money per student by offering a shorter initial degree cycle. Therefore, there was not a logic that putting more money into the Bologna Process would bring about higher attainment. Investment in R&D as percentage of GDP has the Europe 2020 goal to reach 3%/GDP as an EU average. Given the economic crisis starting in 2020, and national budget stresses, there is concern about reaching this goal. In the relationship between employment and tertiary education attainment, the customary negative direction of the relationship is a noteworthy aspect. A positive relationship between GDP per capita and tertiary education is expected, as more wealth per person may facilitate educational access. Given increasing economies of scale in path dependency, it may be expected that the greater the population, the greater the tertiary education attainment (North 2005, Pierson 2004).

Regional groupings

Considering various national regional contexts, diverse successes and challenges exist in policy implementation among the participating countries in the European Higher Education Area (EHEA). There are traditions in higher education that correspond to various social models across regions of Europe that are particular to geographic areas: Anglo-Saxon, Continental, Central and Eastern European, Mediterranean, and Scandinavian. There is great diversity and culture across the European Union (Prügl and Thiel, 2009). Political preferences vary across four regions, including the positions of populist parties in the second decade of the Bologna Process (Leonard 2011). Social policies in employment schemes involve mutual policy-learning among Member States and the EU (Prats-Monné 2010).

In conducting this research, it is debatable to consider into which regional grouping a country may be placed. For example, France may be considered Central as well as Southern. Greece and Luxembourg are removed from sample since they have many missing data observation points. To find approximate numeric balance 25 of the EU countries were giving the following designation for this statistical analysis.

<u>Northern:</u>	<u>Southern:</u>	<u>Central:</u>	<u>Eastern:</u>
Belgium	Cyprus	Austria	Bulgaria
Denmark	France	Czech Republic	Estonia
Finland	Italy	Germany	Latvia
Ireland	Malta	Hungary	Lithuania
Sweden	Portugal	Poland	Romania
The Netherlands	Spain	Slovakia	Slovenia
United Kingdom			

As an idea put forward by the four countries in the Sorbonne Declaration (1998), the Bologna Process served as an international policy proposal to bring about domestic policy reform (Amaral 2013). Given the economic context of declining national budgets, a shorter first-cycle (bachelor) degree promised to provide knowledge and training with relevance for labor market in a shorter amount of time than previous first-degrees. Being able to complete the degree more rapidly and to enter the employment market would cost less for the state, which traditionally covers the cost of education in public universities in Europe. Considering university governance, some of the largest EU countries – France, Germany, Italy, and Spain – traditionally have had centralized education systems. They have had strong advisory leadership from the National Council for Education (or National Council for Universities). With the Bologna Process, autonomy was given to the university institutions thereby lessening the role for the National Councils. This transition of governance in higher education from the state to the university takes place in through a variety of methods given the unique cultural, historical, and social contexts in each country.

Incentives and Barriers to Policy Implementation

Incentives

- * Innovation
 - * Europe 2020 target: 3% R&D/GDP
- * Access
 - * Europe 2020 target: 40% tertiary education attainment, for 30-34 year-olds
 - * Adopted by 47 Bologna Process countries for the EHEA

Barriers

- * Funding policy gap
- * Political and economic uncertainty about the European Union

Incentives: Research Innovation and Access to Higher Education

The most relevant incentives as drivers for higher education policy reform are innovation and universal access, alongside the objective for “internationalization” of universities. Innovation and access to higher education have received extensive attention by participating countries and the European Commission in the initial years of the 21st century. There are target benchmarks, set by the EC Europe 2020 economic growth strategy, to measure innovation in the economy and access to higher education. The national target for R&D/GDP at 3 percent has been a goal of the EC since the Lisbon Strategy and continuing with Europe 2020. Introduced in 2007, the European Research Area underscored the objective for the 3 percent goal, with 2 percent of GDP to originate from the private sector and 1 percent of GDP to originate from the public sector (Amaral 2011:35). Since then, budget austerity has strained public sector finances, and many private sector institutions that were dependent upon public sector funds have received

less for R&D in recent years. In this context, the university has an opportunity to bring about innovation at a time with the private and public sectors have experienced economic limitations. The partnerships between the academic and private sector in the U.S. present an example for the EU (Mazza 2008). Horizon 2020 is the EU's flagship R&D and innovation initiative for the years 2014-2020, and it establishes specific objectives for each country.

The importance of innovation as a driving force propelled a desire for Europe to catch up with the rest of the world by acknowledging a Europe of Knowledge early in the 21st century. "While functionalist explanations underline the role of structural factors in the reorganization of European higher education systems, the utilitarian ones focus more specifically on the change in the logic of action of their actors" (Regini 2011:209). The actors are the stakeholders are the academic sector, public governments, and private businesses providing the market logic. The place of market logic, in higher education systems that have been traditionally dominated by the academic and public government actors, is a powerful force in the 21st century alongside Bologna Process implementation in Europe. In the face of rising costs and limited funds, the market logic may generate funds from the private sector to support the research that leads to innovation and enhances higher education:

Governments have a 'structural' interest to improve performance of their higher education systems, in order to increase both the competitive advantage of their economies and the employability of their citizen. But they must, at the same time, contain the enormous growth of public expenditure entailed by mass university and the cost of basic research (Regini 2011:204).

The incentive for wider access to higher education brings opportunities for knowledge, skills, and training to more people and comes with financial costs. "Massification"² of higher education has been on an upwards trajectory since the mid-20th century as greater numbers of students have become enrolled in higher education. University attendance became more available to society and widespread beyond the traditional elites in the post-World War II years. Advanced economies in Europe and the U.S. concentrated their production in the service sector beyond the preceding agricultural and industrial modes of production. The demand for more educated people to meet technological demands and the quest for social mobility are competing explanations for the broadening of higher education in the post-World War II decades (Regini 2011:202). The importance of access in higher education is evident in the Bologna Process and Europe 2020 target of 40 percent tertiary education completion, for 30-34 years- old in the population, by 2020. In the 1970s Martin Trow described higher education systems as follows (1974, 2010):

² The term "massification" is used in the literature to describe widening access to higher education since the mid-20th century. Trow, Martin. 2010. *Twentieth-Century Higher Education: Elite to Mass to Universal*. Baltimore: Johns Hopkins University Press.

- Elite systems: university students are less than 15 percent of their age cohort
- Mass systems: university students are 15-35 percent of their age cohort
- Universal or generalized-access systems: university students are 35 percent or greater in their age cohort

While “generalized access” is a driver of change in the Bologna Process, it expensive for the state and funding is recognized as a barrier. A rationale of the shorter degree cycle was to spend less on the cost of higher education per individual and to support inclusivity. The massification of higher education has shaped the purposes of higher education in recent decades. Rather than being a traditional regime for the elites as in previous years, higher education became a preparatory training for professional development to match the skills and knowledge demands from the evolving economy. Simultaneous with the recent decades of massification in higher education, the economic demands for human capital labor have changed as technology has become more ubiquitous and has made it necessary to reinvent traditional employment functions that have become obsolete.

Barriers: Funding Policy and EU Uncertainty

The most relevant barriers for higher education reform are economic scarcity that limits funds and uncertainty about European Union political leadership. Regarding economic support for higher education, there are areas of uncertainty at multiple levels of governance. There is uncertainty about various policy aspects of the European Union: the political union, the monetary union and the potential fiscal union. The EC flagship higher education initiative of Erasmus, that provides students with mobility for academic study abroad, faced an uncertain fate in the last months of 2012 (European Commission 2013). Erasmus funding is considered as part of negotiations for the Multiannual Financial Framework (MFF), which budgets for seven-year cycles. In recent years the European Union spends approximately 1 trillion € during each seven years, or approximately 135 billion € each year, in the MFF budget cycle.

By comparison to Erasmus, the Bologna Process primarily is funded nationally by the states, as part of national spending on higher education, rather than by the European Union. Therefore the future of the Bologna Process has not hinged much, as has the future of Erasmus, on the MFF negotiations for 2014-2020:

Member States are increasingly striving to maximise the value of resources invested, including through targeted performance agreements with institutions, competitive funding arrangements, and channeling finance directly to individuals. They are looking to diversify funding sources, using public investment to lever funds from elsewhere and drawing to a larger extent on private funding; tuition fees are becoming more widespread particularly at the master level and above (European Commission 2011:9).

The EC has stated that investment in higher education in Europe is relatively low (1.3percent), by comparison to the United States (2.7 percent) and Japan (1.5 percent) (European

Commission 2011:8). The tuition fees that are often higher at the master degree level bring a need for self-financing that has become a byproduct of the Bologna Process reforms with new degree cycles. While the basis for higher education is public investment, the large scale of funding necessary may draw on additional sources of funds from the private sector (European Commission 2011:8).

There is a context of limited national funds for higher education in national budgets, given austerity measures in the years following the global recession of 2008. A source of funds from the supranational level of the EU, structural and cohesion funds, have the purpose to make economic development more balanced across the broader region. They are provided directly to develop specific sub-regional areas within member states. They are an important part of the MFF at approximately 35 percent of the overall budget with €376 billion over seven years, and are second highest in overall budget allotment after the common agricultural policy and rural development allotment (European Union 2013). “Structural and cohesion funds to upgrade universities could improve the performance of higher education in less economically development regions,” concluded The State of University Policy for Progress in Europe policy report (Hoareau et al. 2012:38).

Beyond the funding gap there is a “funding policy gap” in the area of financing the Bologna Process (Matei 2012:685). For the first time at the Leuven/Louvain-la-Neuve ministerial conference in 2005, funding was recognized as a priority for the Bologna Process. As a guideline to address the funding policy gap, the way forward is twofold according to Matei, the Rapporteur for the International Conference on Funding of Higher Education in September 2011 in Yerevan, Armenia (the location of the 2015 EHEA Ministerial Conference). First, the public responsibility for funding higher education needs to be reaffirmed as a priority. This integral public sector role is possible through an established framework that advances priorities for funding, including that which comes from beyond the public sector. Secondly, “a European space for dialogue in higher education” on funding is essential to consider the opportunities for financing the Bologna Process (Matei 2012:687). Despite the diversity of national policy approaches across Europe it is possible to establish similar public policy objectives for higher education funding that include a plan for long-term growth, accountability, and openness.

The EU facilitates policy implementation in its role as a norm maker in the region. While the EU in some respects may be difficult to comprehend organizationally, with the European Commission as a partner alongside the 47 countries it serves to facilitate implementation of the Bologna Process. The misunderstood and valuable nature of the EU is explained accordingly:

The EU is associated more in the public mind with problems than with achievements, suffering as it does from a culture of pessimism, a structural complexity, an identity crisis, and a knowledge deficit. And yet it has achieved a great deal, not least by way of its contribution to the building of a culture of peace in Europe, its role in helping European states to play a meaningful role on the global stage, and its possibilities as a political, economic, and social model (McCormick 2012:42).

General uncertainty about the future of the EU has a relatively weak impact on EHEA implementation. Given that 19 of the 47 members of the Bologna Process are not in the EU, many of the countries in the EHEA are not involved directly in the EU political uncertainty. The uncertainty about the monetary policy and a potential fiscal union has not had acted as a barrier on implementing the criteria for the EHEA. Instead barriers to implementation have been those of changing the organizational design in university governance rather than in the broader realm of European politics. Barriers are limitations on countries' institutional capacities and domestic economic resources available to support higher education reform. *The State of the Union(s)* published in 2012 by the European Union Center of Excellence at the University Miami analyzes economic and political uncertainty in the EU.

Discussion of Regional Comparisons

The Bologna Process has been described as an intergovernmental, state-led process, and intergovernmentalism interplays with Europeanization (Neave and Maassen 2007). Europeanization has been defined as a top-down process from which EU institutions shape member state's policy (Schmidt 2009, 2005). Increasingly, the market is a third actor, alongside the state and the academic sector in university governance (Regini 2011). Comparing the four regions in regression analysis brings the following conclusions.

- * Employment has statistical significance in each model
- * Three models, except Southern, have an inverse relationship between employment and tertiary education attainment
- * GDP Per Capita has highest statistical significance,
 - o *** $p < .01$, in each of the four regional models
- * R&D/GDP has a negative coefficient in each model, indicating an inverse relationship with Tertiary Education Attainment.
- * R&D and GDP PC are highly correlated, which may not indicate accurate relationships with the dependent variable Tertiary Education Completion.

The same level of highest $p < .01$ statistical significance in GDP Per Capita exists in all four models. This being the only variable with this strongest significance across all four models indicates its importance in explaining Tertiary Education Attainment. Southern $R^2 = 0.57$ is the highest R^2 among the four models. This means that the model for the region of the South provides the greatest explanatory value between the independent and dependent variables. Uniquely, in the Southern region, there is a positive (rather than as expected negative) relationship between Employment and Tertiary Education Attainment.

These coefficients use a Standard (rather than Unstandardized measure) since there are different metrics among the variables. A Wooldridge test showed high autocorrelation between variables. Future research may consider alternative ways to account for the presence of autocorrelation.

Northern	
Education Spending (% GDP)	.792
R&D/GDP	-.322
Trade/GDP	-.471
Employment	-.877**
GDP Per Capita	1.005***
Population	-.227

*** $p < .01$, ** $p < .05$, * $p < .10$
 $R^2 = 0.46$

Central	
Education Spending (% GDP)	.460
R&D/GDP	-.698***
Trade/GDP	.141
Employment	-1.185**
GDP Per Capita	1.218***
Population	.340***

*** $p < .01$, ** $p < .05$, * $p < .10$
 $R^2 = 0.45$

Eastern	
Education Spending (% GDP)	.309
R&D/GDP	-.376**
Trade/GDP	.779***
Employment	- 1.297*
GDP Per Capita	.741***
Population	-.098

*** $p < .01$, ** $p < .05$, * $p < .10$
 $R^2 = 0.51$

Southern	
Education Spending (% GDP)	.450
R&D/GDP	-.115
Trade/GDP	.368*
Employment	3.152***
GDP Per Capita	1.278***
Population	.277

*** $p < .01$, ** $p < .05$, * $p < .10$
 $R^2 = 0.57$

Over nearly four decades there has been relative success of Erasmus, the EU's study abroad program that was initiated in 1986. With an increasing number of students participating in Erasmus each year, the idea behind the Bologna Process was to advance international higher education policy on a larger scale considering the entire academic degree. Given the pressures of economic globalization, the response of internationalization is an effort to coordinate the academic degree structure, national quality assurance agencies, and recognition of degrees across countries in the EHEA. Promising similar degree standards, quality assurance, and academic recognition across countries, the Bologna Process has been met with challenges to achieve this policy convergence. Each of the 47 countries has had a unique experience in policy transitions. Using statistical regression analysis to focus on tertiary education attainment, this paper has considered the experience of four regions among the EU countries in the Bologna Process.

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Quantitative Data Sources:

Tertiary Education Attainment

Eurostat. 2012. Tertiary educational attainment by sex, age group 30-34; Tertiary educational attainment – total. <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=t2020_41> accessed 30 November 2012.

Short Description: "The share of the population aged 30-34 years who have successfully completed university or university-like (tertiary-level) education with an education level ISCED 1997 (International Standard Classification of Education) of 5-6. This indicator measures the Europe 2020 strategy's headline target to increase the share of the 30-34 years old having completed tertiary or equivalent education to at least 40% in 2020."

For Austria years 2000-2003, OECD. Education: Key tables from OECD - ISSN 2075-5120 - © OECD 2010. Tertiary education graduation rates; Percentage of graduates to the population at the typical age of graduation.

Educational Spending as percentage of GDP

Eurostat. 2012. Expenditure on education as % of GDP or public expenditure [educ_figdp]. INDIC_ED. Total public expenditure on education as % of GDP, for all levels of education combined.

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Educational_expenditure_statistics

Missing data note: All countries for 2010 and 2011 take the previous value for 2009 and 2010. Belgium and Slovenia 2000 take next value for 2001. Malta 2000 and 2001 take the next value for 2002. Romania 2006 takes the value for 2005, and 2008 takes the value for 2007.

R&D as percentage of GDP

Eurostat. 2012. The indicator provided is GERD (Gross domestic expenditure on R&D) as a percentage of GDP. "Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications" (Frascati Manual, 2002 edition, § 63). Data updated 10 April 2012.

http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=t2020_20 (accessed 20 November 2012)

Missing data note: For Austria years 2010-2011, the same value for 2009 being. All countries for 2011 take the previous value for 2010. Sweden 2000 takes the value for 2001. Sweden 2002 takes the average value for 2001 and 2003.

Trade as percentage of GDP

World Bank. 2012. Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product Code: NE.TRD.GNFS.ZS. Source: World Bank national accounts data, and OECD National Accounts data files.

Missing data note: Cyprus, Ireland, Poland, and United Kingdom 2011 take the value for 2010.

Trade balance on goods and services (current \$US)

World Bank 2012. External balance on goods and services (formerly resource balance) equals exports of goods and services minus imports of goods and services (previously nonfactor services). Data are in current U.S. dollars.

Code: NE.RSB.GNFS.CD. Source: World Bank national accounts data, and OECD National Accounts data files.

Missing data note: For Cyprus the year 2011 takes the same value as 2010.

Employment as percentage of population

Eurostat. 2012. Employment rate by sex, age group 20-64; Employment rate total. Employment as percentage of population.

GDP per capita

World Bank. 2012. GDP per capita, PPP (current international \$).

GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars. Code: NY.GDP.PCAP.PP.KD. Source: World Bank, International Comparison Program database.

Population

World Bank. 2012. Population, total refers to the total population.

(1) United Nations Population Division. World Population Prospects, (2) United Nations Statistical Division. Population and Vital Statistics Report (various years), (3) Census reports and other statistical publications from national statistical offices, (4) Eurostat: Demographic Statistics, (5) Secretariat of the Pacific Community: Statistics and Demography Programme, and (6) U.S. Census Bureau: International Database. Catalog Sources World Development Indicators

<http://data.worldbank.org/indicator/SP.POP.TOTL> (accessed 20 November 2012)

Overall data note: Greece and Luxembourg are removed from sample since they have many missing data observation points. Therefore 25 of the European Union countries are included in statistical correlation and regression analysis. Croatia joined the EU on 1 July 2013 to become the 28th Member State.