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Discordant Implementation of Multilateral Higher Education Policies: Evidence from the case of the Bologna Process

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ABSTRACT
In pursuit of enhanced employability of university graduates, along with their increased mobility in a rapidly globalizing economy, colleges and universities in the world today participate in regional alliances and partnerships in which shared targets with mutually recognized degrees and curricula are sought across boundaries through transnational higher education policies. The Bologna Process is certainly exemplified as one of the most important multilateral efforts in the recent history of higher education, in establishing such a system of quality assurance within the European Higher Education Area. Although the member states of the Bologna Process endeavor to meet the common benchmarks on the preset assessment criteria, the speed of policy implementation is found to widely vary across the participating countries. This paper attempts to identify the sources of discrepancies in achieving the common policy targets among the member states and explore in particular the extent to which varying stages of socio-economic as well as political development, along with indigenous ethnic and linguistic complexities, affect the robust progress of implementing multilateral higher education policies. Our findings generally suggest significant impacts of these indigenous factors.

Keywords: Bologna Process, Multilateral Policies, European Higher Education Area, Generalized Linear Mixed Model

The Sorbonne Declaration which was signed in Paris by the four education ministers of France, Germany, Italy, and the U.K. in May 1998 was followed by the Bologna Declaration of 1999 with much enthusiasm from the 29 participating countries expressing their willingness to commit to strengthen the competitiveness and attractiveness of European higher education. The Bologna Process initiated by these Declarations is aimed at structural convergence of European higher education, typically represented by the compatibility of academic programs and degrees in the context of improved employability of graduates, which would appeal to potential applicants residing outside the region while enhancing student mobility and partnership among institutions of higher education within the region (Teichler 2008). At the core of the Process is the stipulation of a common structure for a sound quality assurance system for universities in the member states (Musselin and Froment 2007).

The Bologna Process was then inherited as a critical element of the Lisbon Strategy of 2000, whose aim was to make the European Union (EU) "*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*" by year 2010 (European Council 2000). Since then, universities and research institutions have been identified as the principal medium of nurturing human resources as well as innovative research and development (R&D) which are indispensable for achieving the aim of the "Strategy" (Charle 2007; Froment 2007; Vinokur 2008; Wende 2007). The European Higher Education Area (EHEA), realized as an important mission of the Bologna Process was finally launched in 2010, and the unremitting endeavor by the member states in pursuing the original aims of the Process continues today.

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Although the Bologna Process has evolved as a multilateral effort to establish the EHEA with shared benchmarks for achieving the common targets, attitudes toward the "Process" and progress status of each country widely vary (Neave and Massen 2007). The Bologna Follow-up Group (BFUG) has published the Bologna Process Stocktaking Reports (referred to as "BPSR" henceforth) three times in 2005, 2007, and 2009, with the assessment result of the member states' progress based on ten (2005 and 2009) to twelve (2007) criteria and the associated indicators, each of which is evaluated on a five-point rating scale. The BPSR, which presents the result of a stocktaking exercise on the progress made across various action lines such as quality assurance, implementation of the two-cycle degree system (*i.e.*, bachelor's and master's degree system), and recognition of degree and periods of study in each country, clearly documents a discordant progress in the implementation of the Bologna Process.

The primary objective of this paper is to further explore the determinants of this discrepancy among the member states, utilizing the information contained in the BPSRs as well as multiple sources of international data. More specifically, the statistical analysis is conducted based on the above mentioned assessment results, combined with other macro-level data obtained for each country from various international organizations and agencies, to examine the extent to which the implementation of the Bologna Process has been affected by the country-specific institution and environments which include political, socio-economic, ethnic as well as linguistic factors.

Analytical framework and related literature

This study capitalizes on the analytical frameworks or hypotheses, for which theoretical validities have been subject to empirical examination among scholars in the related fields. Our discussion is mainly developed around four major hypotheses. The first is the "economic modernization theory" originally advocated by Lipset (1959) in the context of economic development and enhanced democracy in political science. The modernization theory leads to an argument that economic development would require highly skilled human resources that are produced by formal education, which further expands its roles in widely providing such opportunities for the nations (Meyer and Hannan 1979; Craig 1981). Although the legitimacy of the argument has often been challenged by skeptics (Benavot 1983; Burke 1982; Meyer *et al.* 1977; Meyer *et al.* 1979), Corman (1983); Freeman (1975), and Psacharopoulos (1982) demonstrate the validity of the relationship between economic variables and demand for postsecondary education, from the perspective of human capital theory in economics which accords with the modernization theory.

The second hypothesis is based on the "dependency theory of development", which claims that the "core" nations continue to grow at the expense of the resources provided by the underdeveloped "periphery" of countries (Meyer and Thomas 1980; Walters 1981). Drawing on a multiple regression technique applied on a cross-national dataset which contains both schooling and key development variables for 55 developing countries, Fry (1981) demonstrates that the educational expansion within a single country has little impact on reducing economic inequality and rather shows that the equity issue is strongly related with economic dependency instead. From this viewpoint therefore, it is surmised that a "periphery" of underdeveloped nations are vulnerably responsive to economic as well as political influences of the wealthy "core" countries in the dynamic world system.

The third hypothesis stands on the "political modernization theory" (Meyer and Hannan 1979), which leads to our argument base that a country with a delay in the political aspect of modernization may exercise stronger control over the nation than otherwise through the usage of the formal education system. It is therefore considered that varying degrees of political modernization would become a critical source of discrepancy across states in the speed of implementing a multilateral higher education policy such as the Bologna Process.

Finally, the "social conflict theory" provides an additional and important insight to the analysis. The structure of our society is formed through a chain of conflicts or disagreements arising among individuals and interest groups with different social characteristics. The unequal distribution of power among these actors may then influence the expansion of higher education during the process of their taking a dominant position in creating new stratifications (Collins 1979). Therefore, ethnic and linguistic complexities within a nation, for example, are considered to affect the progress of implementing common higher education policies.

The analysis is conducted to examine the extent to which the above-described four theories on (1) economic modernization, (2) dependency in development, (3) political modernization, and (4) social conflict, affect the permeation of a transnational higher education policy, exemplified in this study by the Bologna Process which is undoubtedly one of the most important multilateral efforts in the recent history of higher education.

Data and Methodology

i. Data

The key elements of analysis, *i.e.*, assessment scores on selected indicators, are drawn from the Bologna Process Stocktaking Reports (BPSRs) published in 2005, 2007, and 2009 by the working groups appointed by the BFUG. However, since other critical components of country- specific characteristics are absent in these reports, additional pieces of information, ranging from basic demographic and socio-economic variables such as population, GDP *per capita*, and Gini coefficient, to more complex political and socio-linguistic information such as the number of political parties in the congress, the share of the dominant ethnic group, and the number of languages spoken in the nation, were sought from various external sources and merged together to build a comprehensive dataset to be used for the analysis.[1]

Table 1 presents the names and brief descriptions of each variable as well as the original source of the variables, with "(t)" indicating that the variable is time varying across the exercise years.

Table 1. List of variables, descriptions and the sources of data

Variable name	Descriptions	Source
% level 5	Proportion of indicators achieving the highest level, *i.e.*, "excellent performance"	BPSR (t)
gdp	GDP *per capita* in US dollars [EM]	WB (t)
% secondary	Secondary school enrollment (%) [EM]	WB (t)
% tertiary	Tertiary school enrollment (%) [EM]	WB (t)
founding	Years elapsed since founding of the state (since 1945) [DD]	CIA
join EU	Years elapsed before joining the EU (since 1958) [DD]	(t)
join BP	Years elapsed before joining the Bologna Process (since 1998) [DD]	BPSR (t)
# political party	Number of political parties [PM]	CIA
% majority party	Share of the majority party in the congress [PM]	CIA
# iop	Number of international organizations the subject country is a member or participate in some other way [PM]	CIA
gini	Gini coefficient [SC]	WB, CIA
% ethnic	Share of the dominant ethnic group (%) [SC]	CIA
# language	Number of languages [SD]	CIA
time	Time elapsed (years since 2005)	(t)
population	Population (x 1.0 million)	WB (t)
scandinavia	Scandinavian dummy (=1 if in Finland, Sweden, or Norway; and 0 otherwise)	---

The codes in the bracket [ ] in the description section indicates the supporting theory/hypothesis: EM="economic modernization", DD="development dependency", PM="political modernization", SC="social conflict". For the code of the data sources, BPSR=Bologna Process Stocktaking Reports; WB="World Development Indicator" by the World Bank, and CIA="World Factbook" by the CIA.

The dependent variable "% level 5" is computed by the authors as the proportion of criteria assessed with the highest achievement in the BPSR. For example, for a country assessed with two criteria achieving the highest level out of ten indicators, a score of ".20" is recorded, while with seven criteria achieving the highest level a score of ".70" is recorded. The dependent variable thus ranges from "0.0" for none of the criteria having been assessed with level 5 and "1.0" for all ten criteria demonstrating the highest maturity in terms of meeting the assessment criteria. The rest of the predictor variables in Table 1 have been chosen to represent the supporting theories explained in the previous section, and descriptions in the table are provided along with the corresponding coding for "economic modernization" (EM), "dependency in development" (DD), "political modernization" (PM), and "social conflict" (SC), except for simple demographic variables, "population" and the dummy for "Scandinavia" as well as time.

The state of progress of the Bologna Process has been shared and confirmed at the Ministerial Conferences that are held every two or three years. In addition, the standing Bologna Follow-up Group (BFUG) oversees the implementation of the Process between the ministerial meetings, constituting the main follow-up structure of the Bologna Process. Although higher education-related policies formed by the EU have no compelling power over the member states, the EU sets the overall goals and necessary criteria and benchmarks to measure policy progress, and thereby encourage the member states to implement the policies and report the progress status. Needless to say, the Bologna Process which certainly is not part of EU policies would not enforce any course of action upon the member countries.

However, an overview of progress has been published in the BPSRs since 2005, in which detailed levels of achievement based on objective criteria are presented for each county in the form of a simple scorecard (BFUG Working Group on Stocktaking 2005, 2007, 2009). Corrective recommendations are then made for the countries found with delayed progress so as to catch up and meet the common targets as soon as possible. In this manner, as the Bologna Process is gradually integrated into the Lisbon Strategy, higher education-related policies of each country have become an integral part of a national strategy toward establishing "*the most competitive and dynamic knowledge-based economy*".

The BPSRs report the progress status of the Bologna Process for each member state, utilizing ten criteria in the 2005 and 2009 survey years, while the 2007 report contains twelve indicators, each of which is rated on a 5-point scale. The scorecards for each

of these indicators, which serve to measure the extent of progress, are then color-coded with the green color to indicate the highest level of achievement (*i.e.*, "excellent performance"), light green for "very good performance," yellow for "good performance," orange for "some progress has been made," and the red color representing "little progress has been made yet".

Table 2. Evaluation Criteria in the Bologna Process Stocktaking Reports (BPSRs)

Scorecard criteria	Year		
	2005	2007	2009
Criteria for the two-cycle degree system :			
1. Stage of implementation of the first and second cycle	○	○	○
2. Access from the first cycle to the second cycle	○	○	○
3. Implementation of national qualifications framework		○	○
Criteria for quality assurance:			
4. Stage of development of external quality assurance system	○	○	○
5. Level of participation of students	○	○	○
6. Level of international participation, co-operation and networking	○	○	○
Criteria for recognition of degrees and periods of study:			
7. Stage of implementation of the diploma supplement (DS)	○	○	○
8. Implementation of the principles of the Lisbon Recognition Convention (LRC)		○	○
9. Stage of implementation of European Credit Transfer System (ECTS)	○	○	○
10. Recognition of prior learning (RPL)		○	○

Source: Bologna Process Stocktaking Reports, 2005, 2007, 2009.

This paper focuses only on the criteria that were assessed in multiple years, *i.e.*, chosen as indicators in at least two survey years by the BFUG, and thus permit us to compare the results across those survey years. Table 2 presents the name of each criterion with the corresponding years marked if questioned in the BPSR exercises. The table shows that, of all the ten criteria chosen for the purpose of our study, seven indicators were commonly included in the 2005, 2007, and 2009 surveys. However, three indicators on "implementation of national qualifications framework," "Implementation of the principles of the Lisbon Recognition Convention," and "recognition of prior learning," were not assessed in the 2005 and 2009 BPSRs.

The stocktaking exercises conducted in the 2005, 2007, and 2009 studies find significant discrepancies across the member states in the progress status of achieving the common targets over the studied period since its inauguration. Figure 1 illustrates the number of countries in each survey year who were assessed with the highest level (*i.e.*, "excellent performance") of achievement, grouped by the number of indicators meeting the highest criterion. For example, the figure indicates that 27 participating countries were found with less than three indicators achieving the highest level of progress in 2005, and 24 countries were marked with the "excellent" green on three to six criteria. However, no countries were reported to have achieved the highest level of progress on seven or more indicators in the same year.

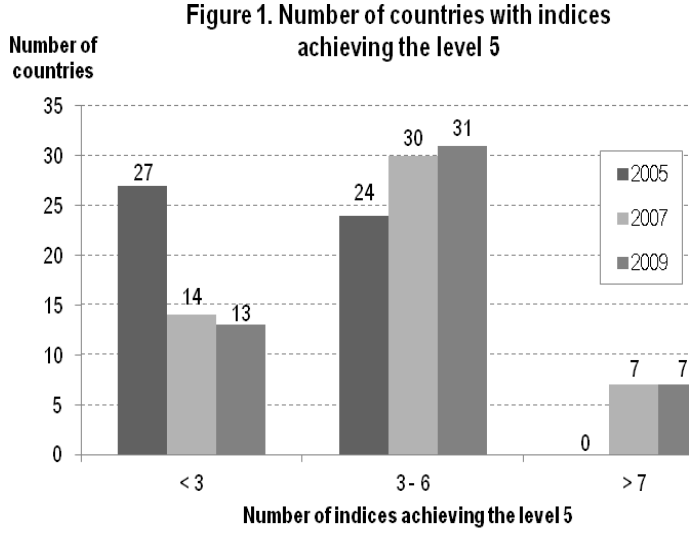

Figure 1. Number of countries with indices achieving the level 5

Source: The Bologna Process Stocktaking Report, 2005, 2007, 2009, Bologna Follow-up Group.

The number of countries measured with the highest achievement on a moderate number of criteria, *i.e.*, three to six indicators, rose from 24 in 2005 to 30 in 2007, while countries with less than three indicators assessed with the highest achievement decreased from 27 in 2005 to 14 in 2007, and seven countries were found with the highest measure on seven or more criteria. Although the Bologna Process appears to have permeated among the member countries between 2005 and 2007, no dramatic progress was observed on the assessment scorecards between 2007 and 2009. However, it is noteworthy that some changes were made to the previous stocktaking methodology and the assessment standard was raised in the 2009 stocktaking exercises. For instance, although Germany was assessed "excellent performance" on eight indicators in both 2005 and 2007 years, the number of indicators rated at the highest achievement in 2009 was found only in five criteria. Therefore,

the measurement scores are not directly comparable between the pre-2009 and 2009 survey years. Nonetheless, Figure 1 suggests a diverse nature of advancement in implementation of the Bologna Process among the member states.

ii. Methodology

The data used in this study is naturally structured in a multilevel design, with each country evaluated at multiple time points, *i.e.*, in 2005, 2007, and 2009. In order to accommodate the specific structure of the data, a multilevel statistical method is applied for estimating the determinants of the varying progress of the Bologna Process across the member states from 2005 through 2009. More specifically, the generalized linear mixed model (GLMM), which is a class of regression models arising in a wide area of statistical applications with a hierarchical data structure (Gelman and Hill 2007; Hox 2002; McCulloch and Searle 2001; Lee, Nelder, and Pawitan 2006), is employed with potential random effects assumed among the participating countries. Thus, our statistical model may be specified in a general form as

$$\begin{aligned} \mathrm{E}[y_i \mid u] &= \mu_i \\ g(\mu_i) &= x_i'\beta + z_i u \end{aligned} \tag{1}$$

where $\mathrm{E}[y_i \mid u]$ represents the conditional mean of y_i given u; $g(\cdot)$ is the link function which transforms the conditional mean μ_i to the linear form of predictors; x_i is the ith row of the model matrix, and β is the corresponding parameters to be estimated. The model also includes z_i which is the random effect vector for each country with u representing the corresponding random effect. The model matrix x_i includes predictor variables as the proxies representing the economic modernization, development dependency, political modernization, and social conflict theories. Thus, the statistical model (1) is specified as

$$P_{ij} = constant + [\mathrm{EM}_{ij}]\beta_1 + [\mathrm{DD}_{ij}]\beta_2 + [\mathrm{PM}_{ij}]\beta_3 + [\mathrm{SC}_{ij}]\beta_4 + u_i \quad \text{for} \quad \begin{array}{l} i = 1, 2, .., \mathrm{n}, \\ j = \text{year } \{2005, 2007, 2009\}, \end{array} \tag{2}$$

where EM, DD, PM, and SC, stand for the vectors of predictor variables representing the underlying theory with the corresponding vector of coefficients β, for the ith country in the jth exercise year. Finally, since the dependent variable P_{ij} is the proportion, for which the numerals ranging from 0.0 to 1.0 are calculated to indicate the progress status of each country, the binomial distribution with the logit link function is employed for estimating the model (2). Therefore, our estimation is categorized as a GLM model with a random intercept.

Estimation Results

The estimation results of selected specifications are presented in Table 3. The first specification (i) shows that the GDP *per capita* has a positive and significant effect on successful implementation of the multilateral policies, *i.e.*, on the proportion of assessment criteria achieving the highest progress. Since the coefficient estimate β of the defined model (2) is the logarithm of odds ratio, the corresponding $\exp(\beta)$ in Table 3 is simply interpreted as the odds ratio. For instance, the $\exp(\beta)$ estimate of "1.207" on the predictor variable under "Time elapsed (years since 2005)" in the specification (i) is interpreted that the odds of a country reaching the highest progress is estimated 1.207 as time elapses by one year.[3]

The second estimation result (ii) demonstrates that the proportion of population enrolled in secondary education also has a positive impact on the progress of the Bologna Process, while the proportion of tertiary school enrollment shows an insignificant effect. Thus, the estimation results (i) and (ii) indicate that the underlying economic modernization theory, represented by the GDP *per capita* and the proportion of secondary school enrollment, is likely to enhance the implementation of the Bologna Process, suggesting that the transnational higher education policy is favorable for economically advanced countries with a relatively younger population.

Also significant in the first estimation is the share of the majority party in the congress, with a significantly negative impact which suggests that a political dominance of a single party may delay the progress. Although the number of languages spoken in a nation is found to have a significantly negative impact on the progress of the Bologna Process in the first specification, no similar finding is obtained for the second estimation.

Finally, the number of years elapsed since 2005 shows a positive effect on the progress of the multilateral policy implementation, simply indicating that the policy implementation steadily progresses with time for the participating countries.

The third column in Table 3 shows similar results to the estimation (ii), with a positive and significant effect of secondary school enrollment. The third specification also reveals that a larger share of the majority party in the congress is likely to delay the progress. Moreover, an increase in the share of the dominant ethnic group of a nation's residents may accelerate the implementation of multilateral policies to a marginal extent. These findings somewhat support non-negligible impacts of the

underlying economic and political modernization as well as the conflict theories as constituting important determinants of the progress in multilateral policy implementation. The estimation result (iv) also shows that the progress status is negatively influenced by the number of years elapsed before the subject countries joined the EU, let alone the Bologna Process, indicating that the progress of multilateral policy implementation is likely to delay for the "peripheral" nations who joined these multilateral efforts led by the "core" countries in later years. The Scandinavian countries, *i.e.*, Finland, Norway, and Sweden, which had established a loose collaborative system even prior to the Bologna Process, are found to lead the implementation of the Bologna Process.

Finally, the estimation (v) indicates that strong dominance of a single party in the congress likely delays the progress of the Bologna Process, suggesting that a diverse mixture of political powers perhaps enhances such efforts. The number of international organizations which the subject countries are members has a positive and significant effect on the progress of policy implementation, which again suggests that international activism is a critical drive factor for success in multilateral efforts. The result also shows that the linguistic complexities along with a large population in a nation are found to hinder achievement of commonly set targets.

Table 3. GLMM estimation of the progress status in the Bologna Process†

Variable	(i) *B* [exp(*β*)]		(ii) *β* [exp(*β*)]		(iii) *β* [exp(*β*)]		(iv) *B* [exp(*β*)]		(v) *β* [exp(*β*)]	
On economic modernization:										
GDP *per capita* (US$)	.038 [1.039]	**								
Secondary education enrollment (%)			.039 [1.040]	***	.041 [1.042]	***				
Postsecondary education enrollment (%)			.001 [1.001]		.000 [1.000]					
On development dependency:										
Years elapsed since founding of the state (since 1945)					.000 [1.000]					
Years elapsed before joining the EU (since 1958)							-.012 [.988]	+		
Years elapsed before joining the Bologna Process (since 1998)							-.146 [.864]	**		
On political modernization:										
Number of political parties	.004 [1.004]		-.012 [.989]		-.014 [.986]				-.005 [.995]	
Share of the majority party in the congress	-1.599 [.202]	**	-1.256 [.285]		-1.560 [.210]	*			-2.041 [.130]	**
Number of international organizations participated									.045 [1.046]	***
On social conflict:										
Gini coefficient	-.015 [.986]		-.031 [.970]		-.038 [.963]		-.013 [.987]		-.023 [.977]	
Share of the dominant ethnic group (%)	.010 [1.010]		.013 [1.014]		.014 [1.014]	+			.007 [1.007]	
Number of languages	-.146 [.865]	**	-.055 [.947]		-.046 [.955]				-.112 [.894]	*
Time elapsed (years since 2005)	.188 [1.207]	*	.364 [1.439]	***	-.046 [.995]		.335 [1.397]	***	.331 [1.392]	***
Population (x 1.0 million)	-.005 [.995]		-.004 [.996]				-.008 [.992]	*	-.015 [.985]	***
Scandinavian dummy							1.355 [3.876]	***		
Random effect (σ_u)	.148		.194		.206		.405	**	.211	
Constant	-.004 [.996]		-.494 [.610]	+	- .530 [.589]	+	-.014 [.986]		-.479 [.619]	*
Deviance	359.8		323.7		324.7		398.8		365.3	
Degree of freedom	89		80		80		100		92	
AIC	379.8		345.7		346.7		414.8		385.3	

† In order to estimate the generalized linear mixed model (GLMM), the "glmer" function included in a package "lme4" in R is run for this study.
** significant at .001 level; ** significant at .01 level; * significant at .05 level; + significant at .10 level.

Implementation of the multilateral policies is found throughout the estimation of all the specifications, except the specification (iii), to steadily progress as time elapses. Perhaps more importantly, a significant random effect is obtained only for estimation of the fourth specification. The estimation results of other specifications reveal no such random effects across the member states, indicating that significant variance may not exist among the countries participating in the Bologna Process with regard to the speed of achieving maturity after controlling the effects of the indigenous variables. Therefore, our preliminary findings indicate that there does not exist a critical dispersion across the member countries in the level of progress, and the discordance in the transnational policy implementation may be attributed to some of the indigenous factors associated with diversities in socio-economic, political, as well as ethnic and linguistic aspects of each country. The finding suggests that equally achieving the multilateral targets among the participating countries at the same pace entails unavoidable lags among the member states until these indigenously attributed discrepancies are resolved.

Conclusions

Our analysis results simply demonstrate that nations with an advanced economy, positioned in the core of the world system rather than being in the peripheral margins, diverse in politics, active in international activities, with a mature secondary education system tend to achieve a great deal of progress in the multilateral effort of the Bologna Process. In other words, the Bologna Process appears to be a favorable system to advanced capitalistic countries, while it may not be an easy policy to implement for yet-to-be-developed states in the region. Thus, the result implies that those with an underdeveloped economy and a high degree of socio-economic, political, ethnic, and linguistic diversities, are required to commit higher costs, both direct monetary costs as well as more indirect time and effort, in order to keep pace with more mature member states to achieve the common goals set by the Bologna Process for the European Higher Education Area (EHEA).

Although the analysis presented in this paper is still at the preliminary stage, the result highlights the difficulties of equally achieving the common targets aimed to resolve multilateral policy agendas, even on today's rapidly globalizing platform. The sources of such difficulties are often deeply rooted in each nation's indigenous factors. However, the finding is perhaps not unique to the case of the Bologna Process *per se*, and similar difficulties would be expected to arise in similar transnational efforts among the ASEAN countries or even within a single country with significant disparities in socio-economic, ethnic, linguistic setups, in addition to the "core-peripheral" positioning.

Nonetheless, the member states of the Bologna Process have implicitly, and perhaps admittedly, internalized the disparities mutually manifested in numerous indigenous factors within the EHEA. The participating countries continue their endeavors to equally achieve the common targets in a harmonious manner as responsible partners in the alliance. Despite the paralleling efforts among the member countries, however, this paper showed that these indigenous factors critically constitute the sources of the discrepancies in the speed of successfully reaching the original aim of the Bologna Process. Further examining how and to what extent various actors and stakeholders within each country attempt to influence and lead the domestic effort of implementing the Bologna Process may be raised as the next research agenda. In addition, accommodating the "peer effect" of mutually stimulating the robust progress among the participating nations is also an important research agenda.

On the technical aspect of the analysis, the currently specified model employs the proportion of criteria meeting the highest, *i.e.*, level 5, benchmarks for the measures of progress as the dependent variable. Although the dependent variable somewhat successfully accommodate the nature of progress status, it does not fully capture the progress made in each country "under the surface", *e.g.*, advancement from the level 2 to level 3 or from the level 3 to level 4. Additionally, confounding correlations between the predictor variables, perhaps arising due to overlap across the underlying theories or hypotheses appear to generate structural complexities in the estimation result. Refining the model in this context would be expected to generate more robust estimates for our analysis.

ENDNOTES

1. The cross-national country-specific variables were obtained from the World Development Indicator (http://data.worldbank.org/indicator), CIA World Factbook (https://www.cia.gov/library/publications/the-world-factbook/), Penn World Table (http://pwt.econ.upenn.edu/php_site/pwt_index.php), and the Bologna Process Stocktaking Reports (http://www.bologna-bergen2005.no/Bergen/050509_Stocktaking.pdf; http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/WGR2007/Stocktaking_report2007.pdf; and http://www.ond.vlaanderen.be/hogeronderwijs/bologna/conference/documents/Stocktaking_report_2009_FINAL.pdf for 2005, 2007, and 2009, respectively).

2. In this paper, the impacts of predictor variables on the dependent variable are discussed based on the signs of the coefficient estimates

and their significance, in order to avoid the complexity of interpreting the actual magnitudes of the estimates.

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