

PROMOTING ACADEMIC INTEGRITY HELPS NATIONAL ECONOMY

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Abstract:

The Academic Integrity Maturity Model (AIMM) was developed to measure the level of academic integrity maturity for particular country. Using the values of AIMM for EU countries, this paper examines the relationships with macroeconomic indicators. The correlation between AIMM and GDP is shown – the more mature the academic integrity in particular country, the richer country. Moreover, the relationship between AIMM and unemployment is examined, as well as between AIMM and added value of tertiary education (in terms of wage difference between secondary and tertiary educated people). Finally, the positive correlation between AIMM and Corruption Perception Index is shown. The paper discusses possible causes of these relationships, compares them with other studies and concludes that increasing academic integrity maturity leads to increase of GDP.

Key words: Academic integrity, AIMM, tertiary education, GDP, unemployment, Corruption Perceptions Index

Introduction

There have been several studies examining the relationships between macroeconomic measures and corruption. Mauro (1996) states that decreasing corruption by two points (on a 0 to 10 CPI scale) will improve GDP per capita by almost 0.5 percentage points. Leite&Weidmann (1999) do not think the relationship is linear, but found 0.7 to 1.2 percentage point decrease of GDP per capita when corruption increases by 1 point (on 0–6 scale). Tenzi and Davoodi (2000) examined data from 97 countries and found the relationship between corruption and GDP with the correlation coefficient -0.80 and talk about indirect effects of growth of about 0.4 percentage points per 1 corruption point (on 0–10 CPI scale). Abed and Davodi (2000) focused on Eastern European countries with transition economies. They found corruption as the most important symptom of underlying policy distortions and evaluated the impact of corruption to GDP per capita to be 1–1.3 percentage points by 1 corruption point (on 0–10 CPI scale). Examples of other studies proving negative impact of corruption to investment, public education spending, public health spending, income inequality, income growth of the poor, child mortality rate or road quality, can be found in Hodess (2001). These empirically proved relationships between the real GDP growth and corruption rate, are good reason to explore the possibility that also other integrity measures (such as AIMM, see below) may be in correlation with macroeconomic aggregates.

As far as we know, no specific study has been conducted directly on the relationship between academic integrity and economic indicators. However, there have been some studies examining the impact of the environment on (dis)honesty. Researchers (Guiso et al. 2004, Zack&Knack 2001) agree that the importance of trust and honesty of individuals in mutual cooperation of economical subjects is well known. These characteristics

help cooperation, allow trade and support economical growth. The study of Innes and Mitra (2013, p. 733) shows that honesty is contagious: *'Exposed to evidence that a large proportion of subjects is dishonest, individuals are themselves dishonest with greater frequency; conversely, exposed to evidence of predominant honesty, individuals tend to be honest more frequently.'*

Harding et al. (2004, p. 311) conducted a survey among students of second and fifth year of study of two technically focused private universities, who attended school and worked full time. *'Students identify common themes in describing both temptations to cheat or to violate workplace policies and factors which caused them to hesitate in acting unethically'* and expressed the *'relationship between self-reported rates of cheating in high school and decisions to cheat in college and to violate workplace policies.'*

Similar conclusions arise from Lawson's study (2004, p. 198). The survey examined views of more than 200 US students and showed *'strong relationship (...) between students' propensity to cheat in an academic setting and their attitude toward unethical behaviour in the business world'*. This observation was confirmed also by Grimes (2004) in his survey conducted on an international sample of nearly 2500 students. According to the study, students both in US and in the transition economies see violation of rules in the business world as more severe compared to violation of rules in academia. Given pair of similar situations, one from academia, one from work, students who evaluate given situation in academia as dishonest, tend towards the same evaluation of corresponding situation at work, and vice versa.

Previously mentioned findings, combined altogether, underline the importance of academic integrity for economic growth. More integrity in education causes more integrity in business and therefore positively influences the economic growth.

This paper aims to answer the question, whether promoting academic integrity in higher education helps national economy. We will describe the Academic Integrity Maturity Model as a measurement tool for particular countries and find correlations between this indicator and commonly used macroeconomic aggregates.

Materials and Methods

Let us describe the indicators of particular EU countries to compare: The Academic Integrity Maturity Model, macroeconomic indicators (GDP per PPS, unemployment rate, wage difference) and Corruption Perception Index.

The Academic Integrity Maturity Model

The Academic Integrity Maturity Model (AIMM) was designed as a part of the project Impact of Policies for Plagiarism in Higher Education across Europe as a universal measure for quantifying and comparing the maturity of processes and systems regarding academic integrity for particular country (Glendinning, 2013). The development of AIMM was inspired by Carnegie Mellon's Capability Maturity Mode (Paulk et al, 1993).

AIMM consists of nine criteria:

- Transparency in academic integrity and quality assurance;

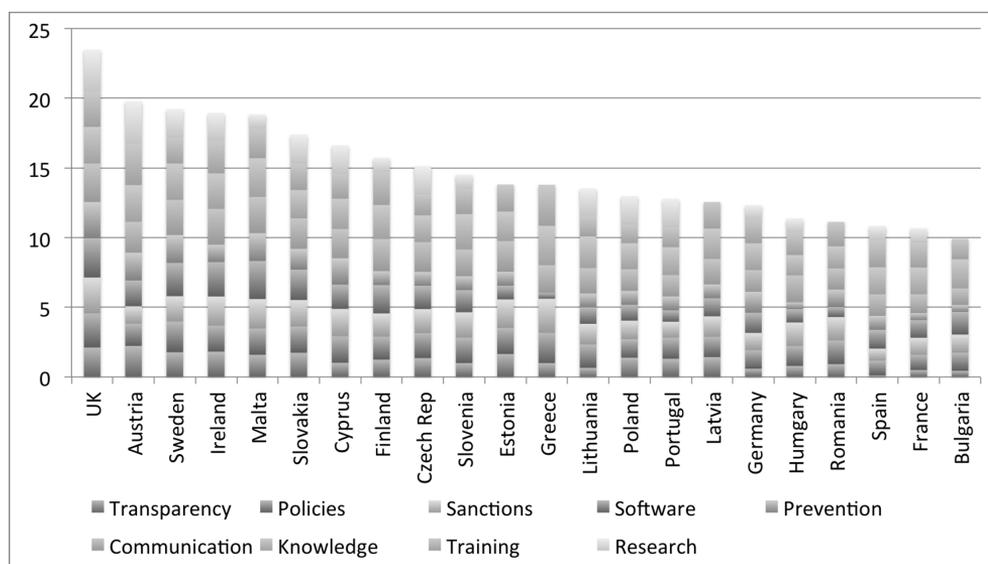


Figure 1. AIMM scores for selected EU countries

- Fair, effective and consistent policies for handling plagiarism and academic dishonesty;
- Standard range of standard sanctions for plagiarism and academic dishonesty;
- Use of digital tools and language repositories;
- Preventative strategies and measures;
- Communication about policies and procedures;
- Knowledge and understanding about academic integrity;
- Training provision for students and teachers;
- Research and innovation in academic integrity.

Values for particular criteria were counted from appropriate answers in surveys, focus groups and structured interviews using weighted average, as well as by an expert assessment. The result for each criterion was a value from 0 (lowest maturity) to 4 (highest maturity). Overall level of integrity of each country was counted as arithmetic average of all nine criteria. Details about methodology, questions used for particular criteria and other aspects of AIMM can be found in IPPHEAE final project report (Glendinning, 2013). The most important fact is that the base for the data was a survey conducted in all EU countries with more than 5000 responses from students, teachers and senior managers in higher education institutions. Counted values of maturity can be seen in Table 1 and are visualized in Figure 1. Authors are aware of the fact that AIMM has not been rigorously tested yet. However, AIMM scores are based on multiple questionnaire items and expert assessments, so triangulation between sources of data helps to minimise the impact of possible inaccuracies.

Table 1

AIMM scores for EU countries (range 0–4, higher score means better performance)

	Transparency	Strategies	Sanctions	Software	Prevention	Communication	Knowledge	Training	Research	AIMM	Rank
Austria	2.23	1.59	1.26	1.85	2.00	2.21	2.63	3.02	3.00	19.79	2
Bulgaria	0.45	1.30	1.30	1.63	0.50	1.19	2.09	1.46	0.00	9.91	22
Cyprus	1.02	1.91	1.96	1.74	1.90	2.10	2.17	1.83	2.00	16.63	7
Czech Rep.	1.36	1.79	1.73	1.67	1.00	2.14	1.92	1.53	2.00	15.13	9
Estonia	1.65	1.87	2.05	0.98	1.00	2.20	2.13	1.93	0.00	13.81	11
Finland	1.25	1.64	1.67	2.03	1.00	2.31	2.45	2.39	1.00	15.74	8
France	0.50	1.09	1.23	1.27	0.50	1.36	1.92	1.83	1.00	10.69	21
Germany	0.59	1.34	1.23	1.45	1.50	1.57	1.92	1.74	1.00	12.33	17
Greece	1.00	2.17	2.45	0.42	0.00	1.98	2.83	2.94	0.00	13.79	12
Hungary	0.79	1.43	1.69	0.95	0.50	1.93	1.45	1.63	1.00	11.38	18
Ireland	1.82	1.87	2.09	2.47	1.25	2.57	2.55	2.33	2.00	18.94	4
Lithuania	0.66	1.68	1.48	1.18	1.00	1.82	2.27	1.44	2.00	13.53	13
Latvia	1.43	1.45	1.47	1.29	1.00	1.82	2.18	1.90	0.00	12.56	16
Malta	1.60	1.88	2.12	2.73	2.00	2.60	2.78	2.15	1.00	18.85	5
Poland	1.39	1.33	1.33	1.14	1.00	1.55	1.87	1.38	2.00	12.98	14
Portugal	1.31	1.52	1.15	0.82	1.00	1.53	2.00	1.47	2.00	12.79	15
Romania	0.92	1.71	1.67	0.72	1.25	1.52	1.59	1.75	0.00	11.13	19
Slovakia	1.74	1.88	1.91	2.18	1.50	2.19	2.03	1.97	2.00	17.39	6
Slovenia	1.00	1.83	1.82	1.59	1.00	1.92	2.54	1.84	1.00	14.53	10
Spain	0.13	1.05	0.86	1.35	1.00	1.55	1.93	1.97	1.00	10.85	20
Sweden	1.78	2.20	1.82	2.39	2.00	2.52	2.62	1.89	2.00	19.22	3
UK	2.12	2.45	2.57	2.82	2.60	2.76	2.63	2.55	3.00	23.49	1

To ensure reliability of the data, we looked also to the number of responses the AIMM score was based on. There were 5 countries with less than 20 responses causing anomalies: Luxembourg, Belgium, Italy, Denmark, and Netherlands. Therefore we excluded these countries from the statistics.

Macroeconomic Indicators

We chose three main macroeconomic indicators to examine their relationship with AIMM:

- GDP
- Unemployment rate
- The difference in wages between secondary and tertiary educated people

GDP: For comparison of academic integrity and GDP we chose GDP expressed in purchasing power standard (PPS) per capita, which is a dimensionless scalar value suitable for all EU member states comparison. The average value for EU is 100. Countries with higher value have GDP greater than average, countries with lower value have GDP lower than average. As the research was made in late 2013, the values of GDP are for year 2012 and were taken from Eurostat (Eurostat, 2013a).

Unemployment: The data about unemployment were also taken from Eurostat. “An unemployed person is defined by Eurostat, according to the guidelines of the International Labour Organization, as someone aged 15 to 74 without work during the reference week who is available to start work within the next two weeks and who has actively sought employment at some time during the last four weeks. The unemployment rate is the number of people unemployed as a percentage of the labour force.” (Eurostat 2013b).

Wage difference: As AIMM describes the maturity of integrity in higher education, one would suppose that countries with higher AIMM score have tertiary education giving higher added value and therefore higher education institution alumni will be much better paid than secondary education alumni. The more mature system, the bigger difference. For each EU country, we took the median of wages of secondary educated people, median of wages of tertiary educated people, counted the ratio and correlation of this ration with AIMM (see Table 2). The data was taken from Eurostat (Eurostat, 2014).

We used Pearson’s correlation coefficient for the indicator dependency evaluation.

The most of the survey was conducted in 2012 and 2013. This fact has two consequences: (1) Croatia as a new EU member state is not included. The IPPHEAE research was done only in 27 EU member states. (2) We count with GDP and unemployment rate values regarding to the year 2012. However, the relative GDP values, we count with, change slowly and do not bring severe inaccuracies. CPI values are for 2013, because Transparency International publishes the data during particular year.

Transparency International Corruption Perceptions Index

The Corruption Perceptions Index (CPI) unfortunately is not based on the real number of corruption occurrences, because is not possible to get this data. CPI merges data from more sources examining corruption in public sector. The data comes from reliable sources gained using reliable methods. The CPI values are standardized to scale 0–100 (Transparency International, 2013b).

There have been several disputes about the reliability of CPI values and about what it exactly measures. Donchev and Ujhelyi (2014) argue that CPI is biased downward from

Table 2

Wage differences, unemployment rate, CPI and AIMM

	AIMM	GDP in PPS (2012)	Unemployment rate 2012 [%]	Median of wages of secondary educated [€]	Median of wages of tertiary educated [€]	Ratio of wages of secondary and tertiary educated	CPI (2013)
Austria	19.79	130	4.30	23517	27786	18%	69
Bulgaria	9.91	47	12.30	3150	4271	36%	41
Cyprus	16.63	92	11.90	16938	23568	39%	63
Czech rep.	15.13	81	7.00	8100	10873	34%	48
Estonia	13.81	71	10.20	5969	8832	48%	68
Finland	15.74	115	7.70	22269	29373	32%	89
France	10.69	109	10.20	20146	26349	31%	71
Germany	12.33	123	5.50	19962	25601	28%	78
Greece	13.79	75	24.30	8799	13234	50%	40
Hungary	11.38	67	10.90	4868	6837	40%	54
Ireland	18.94	129	14.70	19516	27811	43%	72
Lithuania	13.53	72	13.30	4291	6790	58%	57
Latvia	12.56	64	14.90	4471	7052	58%	53
Malta	18.85	86	6.40	13565	18143	34%	56
Poland	12.98	67	10.10	4956	7798	57%	60
Portugal	12.79	76	15.90	9865	15034	52%	62
Romania	11.13	50	7.00	2303	3973	73%	43
Slovakia	17.39	76	14.00	7189	9041	26%	47
Slovenia	14.53	84	8.90	12035	16644	38%	57
Spain	10.85	96	25.00	12571	17874	42%	59
Sweden	19.22	126	8.00	26049	28834	11%	89
UK	23.49	106	7.90	19038	26547	39%	76
Correlation with AIMM	1.00	0.57	-0.33	-	-	-0.45	0.44

the real corruption experience. Corruption perception measure more absolute number of corruption cases than relative (to the population of particular country) one, which penalizes large countries. However, it is a publicly well-known indicator therefore we decided to use it for comparison with AIMM.

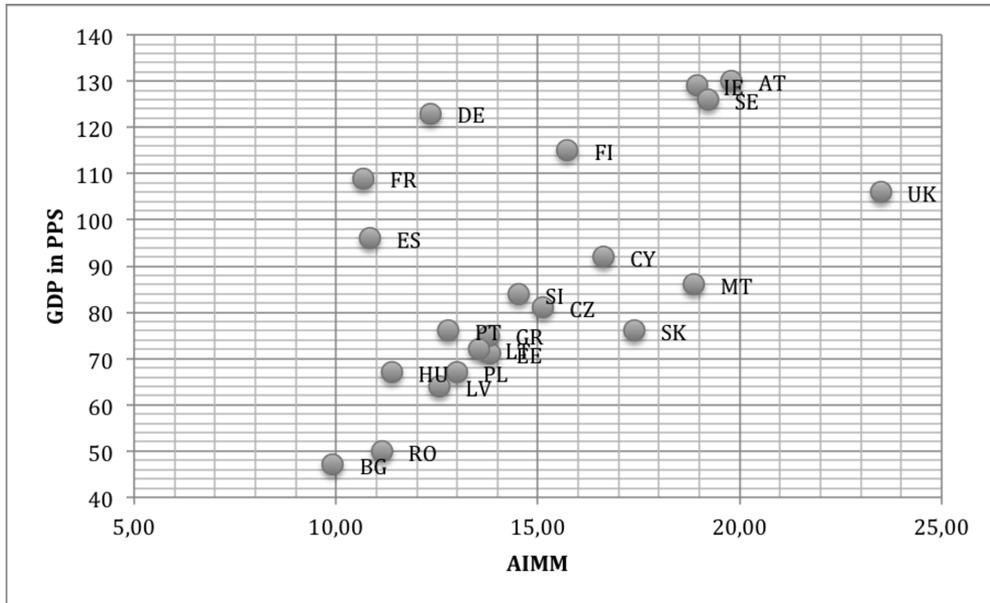


Figure 2. AIMM to GDP

Results

AIMM to GDP

The correlation coefficient between GDP and AIMM is 0.57 (see Table 2), which means moderate correlation. This result supports statements mentioned in the literature review. The trust and honesty of individuals is crucial for economic subject cooperation and supports economical growth. The correlation is visualized in Figure 2.

Next, we examined correlation between GDP and particular AIMM components (see Table 3). The highest correlation is with Software (0.55) and Research (0.53). This is understandable, because research is a very important part of each economy. Thanks to research, each economic subject (and eventually whole economic) can achieve better results without increasing costs of production. Transferred to academia, research in academic integrity ensures more efficient solving of AI issues and therefore more resources can be devoted to pedagogical activities, which improves quality. Software tools come usually from research and therefore these criteria are related.

On the other hand, the categories with lowest correlation coefficient were Sanctions (0.03) and Policies (0.16), which means no correlation.

AIMM to unemployment

The values of unemployment rates can be seen in Table 2. The correlation between AIMM scores and unemployment rate is -0.33 , which means weak negative correlation (see Figure 3). As the unemployment is generally considered as unwanted, negative

Table 3

Correlation of particular AIMM components with examined indicators

	Transparency	Policies	Sanctions	Software	Prevention	Communication	Knowledge	Training	Research	AIMM (total)
Correlation with GDP	0.33	0.16	0.03	0.55	0.48	0.48	0.46	0.51	0.53	0.57
Correlation with unemployment rate	-0.38	-0.14	-0.06	-0.39	-0.51	-0.25	0.01	0.08	-0.27	-0.33
Correlation with wage difference	-0.26	-0.13	-0.01	-0.60	-0.38	-0.38	-0.34	-0.30	-0.40	-0.45
Correlation with CPI	0.31	0.12	-0.01	0.46	0.47	0.41	0.28	0.22	0.41	0.44

correlation is consistent with expectations. The higher is the academic integrity maturity, the lower unemployment. However, unemployment is related to GDP, so this relationship is likely to be secondary.

Looking at particular AIMM components, the highest (meant in absolute value) correlation is with Prevention (-0.51) and Software (-0.39). The lowest correlation is with Knowledge (0.01) and Training (-0.08).

AIMM to wage difference

We calculated also a correlation between AIMM scores and percentage differences between wages of secondary and tertiary educated employees. As shown in Table 2 and in Figure 4, there is moderate negative correlation (-0.45). Therefore, countries with higher AIMM scores surprisingly have lower added value of tertiary education. We will discuss this surprising finding later. Looking at particular AIMM components, the highest correlation is with Software (-0.60) and Research (-0.40). The lowest correlation is with Sanctions (0.01) and Policies (0.13).

AIMM to CPI

The score of AIMM is calculated mainly based on questionnaires, i.e. subjective perception of respondents. Most of the countries do not maintain statistics about real numbers of plagiarism and academic integrity breaches, so hard data are not available. Similarly, CPI (Corruption Perception Index by Transparency International) is counted for a particular country on the basis of respondents' perception of situation. Thanks to similar method, the results can be comparable.

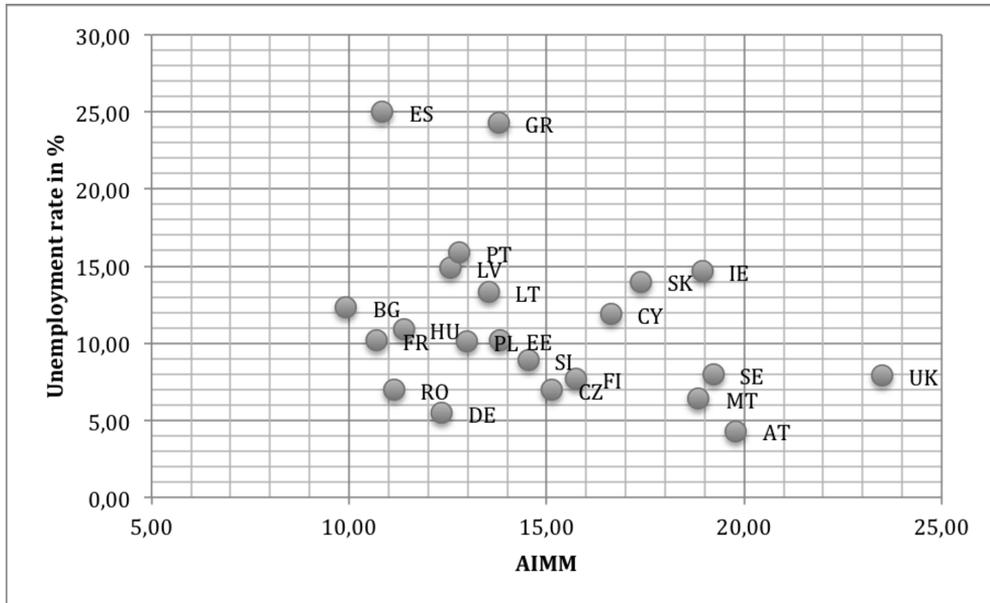


Figure 3. AIMM to unemployment

The values of CPI are shown in Table 2. The data was gained from (Transparency International, 2013a). There is a moderate correlation of overall AIMM scores and CPI (0.44), see Figure 5. Looking at particular AIMM criteria, the highest correlation is with Prevention (0.47) and Software (0.46). No correlation was found between CPI and Sanctions (-0.01) and Policies (0.12)

Discussion

The negative correlation between AIMM and unemployment can be explained as follows: If there is high long-term unemployment rate in particular country, people tend to be less satisfied with their lives, crime increases and people give up an honest way of life and tend to dishonesty including academic integrity breaches.

Let us try to explain the negative correlation between AIMM and wage difference. What is better for the society? Lower, or higher difference? In case of high difference people will be more motivated for their studies and the number of tertiary education alumni will increase. This corresponds to actual trend of teaching more and more people at HEIs with the same resources. There is no doubt about the contribution of educated people for society; however, there are not so many positions for such educated people. Therefore tertiary education alumni work in positions where secondary education would suffice. This significantly decreases the difference in wages.

As shown in Table 2, the wage difference is in negative correlation with GDP (-0.57). Economically more developed countries have lower wage difference. This fact could

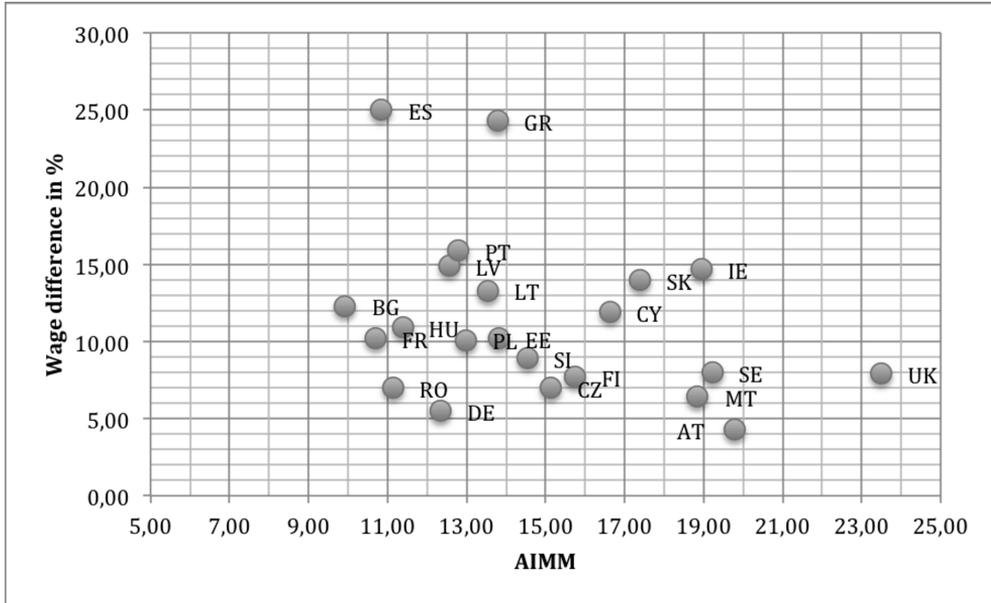


Figure 4. AIMM to wage difference

be explained by better education system producing more educated people without appropriate job vacancies for higher education alumni.

The most probable explanation, why countries with high difference achieve low academic integrity maturity, is the fact, that number of tertiary education alumni in these countries is low and insufficient supply of tertiary educated labour force increases its price.

The correlation between AIMM and CPI supports the conclusions of Innes and Mitra (2013) that honesty is contagious. Also, Harding's (Harding et al, 2004) findings are confirmed by existence of this correlation. Students bear their honesty to their later employment. This finding also supports Grimes' (2004) study.

Research also showed the relationship between the level of plagiarism prevention of particular countries and corruption level. Countries with low corruption level are aware that it is necessary to lead their citizens to honesty during their studies. It is the cheapest and simplest way. Moreover, richer countries can afford to invest more in research and development and are more likely to be able to fund initiatives for improving academic integrity.

Conclusion

The research in this paper was based on the values of AIMM. We showed that AIMM scores are in correlation with CPI proving that honesty is contagious and that academic integrity is related to business ethics. We also showed that academic integrity is in

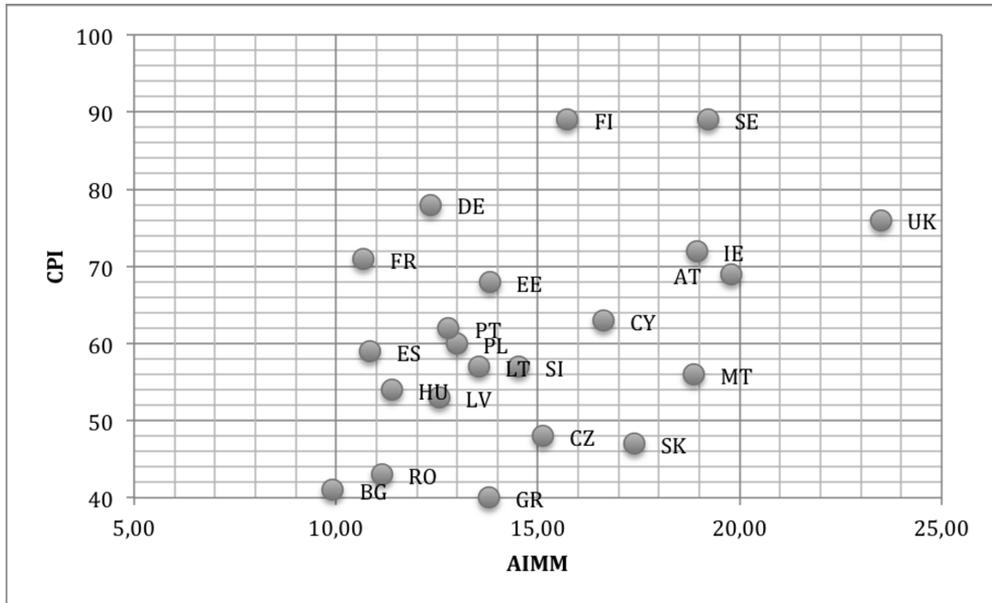


Figure 5. AIMM to CPI

positive correlation with GDP and with negative correlation to unemployment and wage difference between secondary and tertiary educated people.

We found the relation between AIMM and GDP as the most important one. We are aware that correlation does not mean causality. The causality in overall country indicators is often both-directional. The richer country is, the more money goes to education system. Therefore higher education institutions can afford software tools, integrity officers and other bodies promoting and enforcing academic integrity at particular institutions. On the other hand, building the integrity structures, raising awareness about integrity issues and rising students' integrity level makes business more ethically mature causing more trust, promoting trade and increasing GDP. Promoting academic integrity directly or indirectly tends to impact positively on national economies.

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References

- DONCHEC, D. AND G. UJHELYI 2014. *What Do Corruption Indices Measure?* Economics & Politics, Vol. 26, No. 2. <http://onlinelibrary.wiley.com/doi/10.1111/ecpo.12037/pdf>

- EUROSTAT 2013a: *Unemployment Rate*.
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics
- EUROSTAT 2013b: *GDP per Capita in PPS*.
http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/GDP_per_capita,_consumption_per_capita_and_price_level_indices
- EUROSTAT 2014: *Mean and Median Income by Education Level (source: SILC)*.
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_dio8&lang=en
- GLENDINNING, IRENE. *Comparison of policies for Academic Integrity in Higher Education across the European Union*. Project report. http://ippheae.eu/images/results/2013_12_pdf/D2-3-00%20EU%201PPHEAE%20CU%20Survey%20EU-wide%20report.pdf
- GRIMES, PAUL W. 2004. *Dishonesty in Academics and Business: A Cross-Cultural Evaluation of Student Attitudes*. *Journal of Business Ethics*, 2004, vol. 49, no. 3, pp. 273–290.
<http://link.springer.com/article/10.1023%2FB%3ABUSI.0000017969.29461.30>
- GUISSO, LUIGI, PAOLA SAPIENZA AND LUIGI ZINGALES 2004. *The Role of Social Capital in Financial Development*. *The American Economic Review*, Vol. 94, No. 3 (Jun., 2004), pp. 526–556.
<http://www.jstor.org/stable/info/3592941>
- HARDING, TREVOR S., DONALD D. CARPENTER, CYNTHIA J. FINELLI AND HONOR J. PASSOW 2004. *Does Academic Dishonesty Relate to Unethical Behavior in Professional Practice? An Exploratory Study*. *Science & Engineering Ethics*, Vol. 10, no. 2 pp. 311–324.
<http://link.springer.com/article/10.1007/s11948-004-0027-3>
- HODESS, ROBIN (ed.) 2001. *Global Corruption Report 2001*. Transparency International.
http://files.transparency.org/content/download/487/2006/file/2001_GCR_Inaugural_EN.pdf
- INNES, ROBERT AND ARNAB MITRA 2013. *Is Dishonesty Contagious?* *Economic Inquiry*, 51: 722–734.
<http://onlinelibrary.wiley.com/doi/10.1111/j.1465-7295.2012.00470.x/full>
- LAWSON, RAEF A. 2004. *Is Classroom Cheating Related to Business Students' Propensity to Cheat in the "Real World"?* *Journal of Business Ethics*, 2004, vol. 49, no. 2 pp. 189–199.
<http://link.springer.com/article/10.1023>
- LEITE, CARLOS A. AND JENS WEIDMANN 1999. *Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth*. IMF Working Paper No. 99/85.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=259928
- MAURO, PAOLO 1996. *The Effects of Corruption on Growth, Investment, and Government Expenditure*. IMF Working Paper no. 96/98. 1–28, 1996. <http://ssrn.com/abstract=882994>
- PAULK, MARK C. CHARLES V WEBER, BILL CURTIS AND MARY BETH CHRISSIS 1993. *Capability Maturity Model for Software (Version 1.1). Technical Report* (Pittsburgh, PA: Software Engineering Institute, Carnegie Mellon University). CMU/SEI-93-TR-024 ESC-TR-93-177. <http://www.sei.cmu.edu/reports/93tro24.pdf>
- TANZI, VITO AND HAMID R. DAVOODI 2000. *Corruption, Growth, and Public Finances*. IMF Working Paper, pp. 1–27, 2000. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=880260
- TRANSPARENCY INTERNATIONAL 2013a: *Corruption Perception Index*.
<http://cpi.transparency.org/cpi2013/results/>
- TRANSPARENCY INTERNATIONAL 2013b: *Corruption Perception Index in Detail*.
http://www.transparency.org/cpi2013/in_detail
- ZAK, PAUL J. AND STEPHEN KNACK 2001. *Trust and Growth*. *Economic Journal*, Vol. 111, No. 470. March 2001.
<http://onlinelibrary.wiley.com/doi/10.1111/1468-0297.00609/abstract>