WORKPLACE AND OFFICIAL STATISTICS:
HOW CAN HIGHER EDUCATION CONTRIBUTE TO A BETTER RELATIONSHIP?

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Official statistics data are needed in the workplace (for benchmarking, market analysis, etc.) but have been largely under-utilized. A study among businesses of five countries in the BLUE-ETS project suggests it might be hard to find relevant data and use them adequately, which might also reflect the lack of search skills and knowledge about how to apply official statistics to the business situation and interpret the results. In this paper we link the origins of this state of affairs to higher education where an important part of future labor force obtains relevant knowledge about, attitudes towards, and skills to find and use, official statistics. Building on a survey among educators from the European EQUIS-accredited business schools, we aim to provide answers to two questions: (1) how can business school educators contribute to the broader use of official statistics, and (2) how can official statistics providers support business school educators.

INTRODUCTION

Official statistics are needed and used in the workplace for various purposes. Some examples include comparisons with competitors, the industry, and the economy in general, market analysis, internal and external reporting, tenders, official applications, contracts and agreements. However, several kinds of issues seem to hinder a broader use of these statistics among businesses, especially unawareness of their existence or business relevance, as well as problems finding and applying them (Lorenc et al., 2012). Official statistics providers can use different approaches to tackle these issues. In this paper we look for a solution in higher education, more specifically in business study programs where an important part of future labor force is to obtain relevant knowledge about, attitudes towards, and skills to find and use, official statistics.

RESEARCH FRAMEWORK

Our data come from a survey carried out as part of the BLUE-ETS Project (www.blue-ets.eu), a three-year collaborative effort dedicated to various aspects of official business statistics funded by the European Commission's Seventh Framework Programme (grant agreement n° 244767). The survey was conducted among educators from the European EQUIS-accredited business schools. EQUIS is the European Foundation for Management Development (EFMD) network's quality improvement system. Its fundamental objective is to raise the standard of management education worldwide (About EFMD, 2014). Currently there are 144 EQUIS-accredited educational institutions in 39 countries: 81 schools from 19 European countries and 63 schools from 20 countries in the rest of the world (EQUIS Accredited Schools, 2014).

Our measurement instrument was an online questionnaire which consisted of 35 questions. The estimated time necessary to complete the questionnaire was 10-15 minutes. The survey was active in the period between June 19th and November 11th, 2011. An invitation to fill in the questionnaire was sent via e-mail to 5,274 full-time faculty members of all 70 European EQUIS accredited business schools at that time. A total of 228 usable responses were obtained (192 complete and 36 partial), with an additional 87 returned as undeliverable, thus yielding a response rate of 4.4%.

SAMPLE CHARACTERISTICS

Our sample includes 191 respondents who answered the question about their gender. 133 (69.6%) were male, 58 (30.4%) were female. 190 respondents answered the question about their level of education, a large majority of which (178 respondents or 93.7%) had a doctoral degree, followed by 11 (5.8%) respondents with a master's degree, whereas only one (0.5%) respondent had a bachelor degree. More than one third of the respondents were Full Professors, followed by Associate Professors (28.9%) and Assistant Professors (24.2%).

189 respondents provided us with an indication of their current mode of employment. 179 or 94.7% of the respondents were full-time employees of their respective academic institution, followed by 8 (4.2%) respondents who were employed part-time. One respondent (0.5%) worked for the business school on a contract basis and another one (0.5%) indicated some other mode of employment. The average number of years of the respondents' professional experience was 17.1 years (minimum 0 years, maximum 50 years, SD 10.8), whereas the average number of years spent teaching at a higher education institution was 15.1 years (minimum 1 year, maximum 44 years, SD 9.6). Finally, 162 (71.7%) respondents indicated that their teaching is primarily focused on business, 47 (20.8%) on economics, 9 (4.0%) on statistics and 8 (3.5%) on econometrics.

RESEARCH RESULTS

Methodological Remarks

The results presented in this section are based on responses received from 111 business school educators that claimed they used "materials produced by institutional data providers (such as national statistical institutes, central banks, government agencies, Eurostat, US Census Bureau, etc.)" in their most recent course. Every educator thus reported on the inclusion of official statistics into their most recent course. Although the low response rate and the selection of a single course to report (motivated by concerns of excessive survey length) may cast some doubt on the representativeness of results, it is important to note that our primary aim was to find out where and how official statistics figure in business study programs rather than to quantify its presence across business educators and courses.

Modes of Official Statistics' Use by Business Educators

Our respondents associated official statistics with the following elements (percentages in parentheses represent ratios between the number of educators stating to be using the element and the total number of respondents):
- interpretation (98.0%);
- conceptual understanding (84.5%);
- data visualization (76.0%);
- secondary data search (57.7%);
- facts about methodology (51.9%);
- statistical computing (49.0%);
- secondary data quality assessment (41.0%).

Furthermore, by and large our respondents used official statistics for the *purpose* of familiarizing their students with the current state of a given phenomenon (83%) or illustrating its development in time (82%). Fewer of them used official statistics to explain methodology behind a chosen indicator (34%) or to technically explain the analytical method (29%); if they did use one of them, they mainly combined it with the presentation of the phenomenon's current state and/or its development. A small group of our respondents (12%) used all four mentioned approaches.

Official statistics most commonly appeared on lecture slides (91%). More than half of our respondents used official statistics in study notes available to students (60%), teaching notes as part of educator's class preparation (60%) and exercises (59%). Less frequently official statistics were used in exam questions (43%), and even more rarely in seminar paper guidelines (28%). However, it has to be noted that part of the reason for the latter was also the fact that these business educators have not been using such guidelines. Other examples included compendium, group project and assignments.

We were also interested in *how have our respondents been presenting official statistics to their students*. Nearly all of them (95%) did that in the framework of lectures. Some other modes were also used but involved less than a third of the analyzed courses:
- in tutorials with computer access (28%);
- in tutorials without computer access (23%);
- in course chat groups/forums (20%);
- in e-learning sessions (14%);

- elsewhere, e.g. in workshops (20%).

In addition, students encountered *official statistics independently* (on their own) in various activities:
- when preparing course projects (59%);
- when preparing homework (56%);
- when answering exam questions (48%);
- when preparing seminar papers (40%).

These descriptive statistics already provide some insights into the use of official statistics in the business study programs. It appears that official statistics are nearly always linked to interpretation, and very often to conceptual understanding. They are also associated with other elements but some of these elements are likely to be closely connected to the course topic (e.g. statistical computing).

Other descriptive statistics presented above mainly reflect an educator's teaching approach as well as his or her decisions about the course content and the mix of pedagogic activities. Appearance of official statistics in a certain pedagogic activity is first conditional on the educator's selection of that pedagogic activity; for instance, if seminar papers are required for a course, official statistics can be used in their preparation. Additionally, it is the educator's decision whether and how to include official statistics in the course. Given the fact that nearly all studied educators presented official statistics in their lectures and had them on their lecture slides despite various course topics suggests broad applicability and relevance of official statistics for topics taught in the business study programs. However, when exploring the use of official statistics beyond lectures, our respondents differed considerably. To better understand these differences, we classified them in three groups using Ward's hierarchical clustering method based on the squared Euclidean distance for binary data.

As Table 1 shows, the clustering was based on 94 educators (due to some missing values) and 9 binary variables describing different uses. It revealed *three groups of educators* with respect to how they incorporated official statistics in their course. Specific uses of official statistics significantly differed across the three groups ($p<0.01$) with one exception: in all three groups official statistics were used for illustration of a phenomenon and/or methodological explanations.

Table 1: Specific uses of official statistics by three groups of business school educators

Binary variables included in the clustering	Group 1 (*N*=37) Comprehensive users	Group 2 (*N*=31) Teacher-focused users	Group 3 (*N*=26) Student-focused users	Total (*N*=94*)
Official statistics appearing in teaching notes as part of teacher's preparation	95%	68%	0%	60%
Official statistics appearing in lecture slides	100%	100%	69%	91%
Official statistics appearing in study notes for students	92%	39%	42%	61%
Official statistics appearing in seminar paper guidelines	54%	13%	8%	28%
Official statistics appearing in exercises	84%	23%	61%	57%
Official statistics appearing in exam questions	68%	16%	42%	44%
Official statistics presented to students outside lectures (e.g. in tutorials, forums)	86%	13%	65%	56%
Students using official statistics (e.g. preparing homework or projects, answering exam questions)	95%	74%	100%	89%
Official statistics used in class for illustration of a phenomenon and/or methodological explanations	97%	100%	96%	98%

Note: Fisher's Exact Test for all variables except the last one: *p*<0.01; * Due to some missing values, the analysis was based on *N*=94.

Let us take a closer look at characteristics of group members:

- *Group 1 – Comprehensive users* of official statistics (*n*=37): these educators used official statistics the most. The majority included official statistics in lecture slides, own teaching notes and study notes for students. Most of them created several opportunities for students to come in close contact with official statistics, especially in their independent exploration and various pedagogic activities besides lectures. More than half of them even included them in seminar paper guidelines.
- *Group 2 – Teacher-focused users* of official statistics (*n*=31): all educators in this group used official statistics in their lecture slides; two thirds also in their personal teaching notes. However, they scored the worst (or much worse in comparison to other groups) on items related to all other possible applications of official statistics that relate to students. Very few presented official statistics to students outside lectures, included official statistics in seminar paper guidelines, exam questions or exercises; less than half included official statistics in study notes for students. Although three quarters of them had their students use official statistics on their own, this was the lowest proportion among the three groups.
- *Group 3 – Student-focused users* of official statistics (*n*=26): this group includes all educators that did not use official statistics in their lecture slides. That explains the lowest (although still considerable) share among the three groups. None of these educators used own teaching notes with official statistics. However, they all involved students in independent exploration of official statistics. More than half presented official statistics to students outside lectures and used them in exercises, somewhat less than half also used them in exam questions and study notes for students.

Personal characteristics of group members do not differ extremely across the groups though the *Comprehensive users* (Group 1) included slightly more women (35% compared to 27% and 22% in Group 2 and Group 3 respectively) and their course focus was slightly more in economics (35% compared to 29% and 27% in Group 2 and Group 3 respectively). 38% of analyzed courses in this group were taught at the undergraduate level (compared to 26% and 32% in Group 2 and Group 3 respectively). On the other hand, the *Teacher-focused users* (Group 2) had the largest share of Assistant Professors (40% compared to 19% and 30% in Group 1 and Group 3 respectively). As a consequence they had a somewhat shorter professional experience (14 years compared to 18 and 20 in Group 1 and Group 3 respectively), although this still means more than a decade of teaching at a higher institution (12 years compared to 17 in the other two groups).

Business School Educators' Expectations and Recommendations Concerning Official Statistics
Our respondents indicated various institutional data providers as the most important for their particular course. Most respondents singled out one institution (e.g. "Eurostat", "Office for National Statistics) or used a general expression from which a particular institution could be inferred (e.g. "national statistical institute"); a few named two institutions (e.g. "Eurostat and OECD") or specified a type of institution (e.g. "international organisations"). Among 69 answers and 78 providers, various international organizations appeared 36 times (most often Eurostat, IMF and OECD; 13, 8 and 7 times respectively), national statistical institutes appeared 19 times and national central banks 7 times. Some respondents also listed intermediaries of official statistics such as Datastream.

Several reasons were given why the explicitly named institutional data provider was deemed the most important. The two highest rated reasons were free data and easy access (*M*=3.7 on a 5-point scale from 1 – not at all important to 5 – very important), followed by sufficiently long time series (*M*=3.3) and user-friendly download format (*M*=3.1). The other three listed reasons scored slightly below the middle value: creating own tables (*M*=2.9), establishing logical links to other courses/topics and sufficient metadata to judge data quality (both *M*=2.8). Easy access was also the reason on which the highest agreement was reached (*SD*=1.1, *CV*=0.3).

We also asked business school educators if they had any recommendations for institutional data providers. 18 educators provided an answer. About half of answers included recommendations for easier access and user-friendliness (including easy download):

"Even if it's not the main element of choice, official data is often not very user friendly!"
"Make it very very simple to find what we want."
"Sometimes it is difficult to find exactly what is needed. Some high-level tables of contents and improved search facilities would help."

One respondent appeared to be quite irritated: *"MAKE YOUR DATA AVAILABLE IN INTEROPERABLE WAY, which is easy to access and combine to other data sources free of legal and technical obstacles for the data use and international context. Otherwise you are just providing bad service and spending tax payer money."*

Another respondent pointed out the positive and negative sides: *"The EUROSTAT site which I use regularly is not always the easiest to navigate when first encountered (e.g. by a new student); but one gets familiar and it is an excellent source. Similar comments apply to OECD which I recommend for international statistics outside of EU. My students are strongly discouraged from using the CIA factbook which is subject to the criticism of distortion. I mention this because internet searchers often hit this first when they use a search engine. They need to be made aware of the better and more reliable sources."*

Five respondents exposed free access to data. Other recommendations referred to stability (permanent web location of data; avoiding and communicating time series breaks); inclusion of animated visualizations; availability of helpdesk for academic users; and an appeal on emphasis of provider's activities on pedagogic aspects. In other words: most recommendations we gathered in the framework of our survey were pretty technical; very few were substantial in terms of at least referring to pedagogic aspects. The last quote above about Eurostat, for instance, contains some insights on pedagogic activities by mentioning problems and threats faced by students in the pedagogic process when using (or trying to use) data offered by two renowned international organizations. Another quote suggested what is important for pedagogic purposes: *"Continuity in time-series data is important. Frequent breaks and jumps due to changes in measurement methodology, etc., render a lot of macroeconomic time series virtually unusable. Comparability over large cross-sections - i.e. availability of similar data series for a large number of countries - is also important."* A hint on problems in pedagogic process also came with the following explanation *"... (e.g. I get XLS files with every other column empty; I have to spend time cleaning up the file before analyzing)"*.

CONCLUSIONS AND RECOMMENDED COURSE OF ACTION

General Conclusions

On the basis of our results it is possible to conclude that only a small group of business educators can be characterized as heavy users of official statistics; some educators do not use them at all, others use them either mainly for own preparation and presentation or mainly for students' activities. The most pervasive use of official statistics as part of lectures is also the most passive use of official statistics from the student point of view. Activities that offer students a more direct experience with official statistics are not that broadly used. However, it is good that most educators who use official statistics offer their students at least one opportunity to use official statistics on their own even if it is not an in-depth encounter (e.g. in exam questions).

Possible Contribution of Business School Educators to the Broader Use of Official Statistics

When it comes to the possible contribution of business school educators to the broader use of official statistics our research indicates that business school educators can continuously and systematically include official statistics in all types of pedagogic activities and study materials. Such omnipresence of official statistics can only be expected if official statistics are considered relevant to achievement of pedagogic goals related to knowledge, skills, and student activation as well as motivation. Our analysis showed that official statistics do appear in courses taught at undergraduate and graduate levels by teachers of economics, business, statistics and econometrics, and in a variety of other courses (although this last point was not exposed in the paper). Our data, however, do not contain cases or examples.

Possible Support of Business School Educators by Official Statistics Providers

Our research indicates that an obvious hindrance to a more intensive use of official statistics is of a technical nature and primarily concerns access to official statistics data in the broadest sense. Official statistics providers can support business school educators by first and foremost offering free (and if possible also clean) data and user-friendly access to data on their websites. Furthermore, they can support easy and correct use of data, e.g. by availability of a specialized helpdesk, by offering simplified methodological information, by avoiding and communicating time series breaks, etc. They can foster repetitive use of data by keeping permanent web location of data, by offering options to save searches and history for registered users. They can also stimulate creative use of data, e.g. by inclusion of visualization tools.

The above mentioned options would be beneficial to heavy and occasional users of official statistics from among business school educators but they may not be sufficient to turn occasional users into heavy users or bring in new users. A more proactive role of official statistics providers may be necessary. Given that heavy users seem to have many ideas on which official statistics to use and how, official statistics providers may consider inviting them into a partnership to develop interesting examples of teaching materials with their data, e.g. teaching cases or (preferably interactive) exercises. Their availability would more likely convince non-users or occasional users of relevance and value of official statistics for the teaching and learning process in the framework of their particular course.

ACKNOWLEDGEMENTS

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