The shift towards entrepreneurial universities and the relevance of third-party funding of business and economics units in Austria: a research note

Melanie Wiener¹ · Daniela Maresch² · Robert J. Breiteneker³

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Abstract

The importance of public and private third-party funding of universities has changed over the last decades. However, the knowledge about how universities finance their research are rather limited. We aim to fill this gap and investigate the funding structure of universities and how third-party funding has changed over time. In our explorative analysis, we use publicly available data of four Austrian universities. We analyze this data at university level as well as the level of the faculty of business and economics. We provide insight into the development and structure of third-party funding and conclude that universities' funding structures differ and has developed over time.

Keywords Third-party funding · Public universities · Management faculties · Austria · Development over time · Entrepreneurial universities

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✉ Melanie Wiener
melanie.wiener@jku.at

Daniela Maresch
maresch@sam.sdu.dk

Robert J. Breiteneker
robert.breiteneker@jku.at

¹ Institute for Integrated Quality Design, Johannes Kepler University Linz, Altenbergerstrasse 49, 4040 Linz, Austria

² Department of Entrepreneurship and Relationship Management, University of Southern Denmark, Universitetsparken 1, 60000 Kolding, Denmark

³ Institute of Innovation Management, Johannes Kepler University Linz, Altenbergerstrasse 49, 4040 Linz, Austria

1 Introduction

In recent decades, university funding has changed considerably across Europe. National governments have started to implement new allocation mechanisms by tying the funding provided to universities to their performance. The aim is to increase efficiency and productivity by fostering competition and rewarding output. The main argument is that if funding is provided to those who perform best, better results will be achieved, and others will have an incentive to perform better (Auranen and Nieminen 2010). In addition, third-party funding from both public and private sources has gained importance. As third-party funding is typically awarded through a competitive process, this development has put even more weight on competition and output. However, earlier research has revealed that competition and output-based incentives do not always result in a higher level of efficiency and productivity. Rather, they may have some unintended negative consequences, such as a mainstream focus and weaker societal impacts (e.g. Butler 2003; Langford et al. 2006).

For policy-makers, it is thus decisive to understand the relationship between different sources of funding, the process through which funding is provided, and the universities' output to design effective and efficient policy measures. To do so, it is necessary to first understand the funding structure in a particular country before exploring how it affects output. In this paper, we will explore the funding of Austrian universities and the importance of different sources of funding. Austria is a good example for a university sector that has changed from input-oriented public funding to performance-oriented public and private funding during the last 2 decades. Using data from four public universities for the period from 2007 to 2017, we will first investigate the relationship between third-party funding and core funding as well as the relationship between third-party funded scientific staff and the entire scientific staff. In addition, we will investigate the structure of third-party funding based on funding sources. Then, we will focus on the role of third-party funding in business and economics. Our findings reveal the increasing importance of third-party funding in business and economics. They further highlight that the non-periodic allocation of funds by the funding institution makes it necessary to use longitudinal data. For policy makers, our results indicate the importance of adapting policies to their own systems, accounting for the political and systemic environment (Auranen and Nieminen 2010). This requires an understanding of the funding structures as well as of the relationship between funding structures and output.

2 Background

2.1 The shift from public bodies towards entrepreneurial universities

Since the nineteenth century, universities in German-speaking countries have been based on Humboldt's principle that research should be unbiased and

independent from ideological, economic, political or religious influences. Traditionally, universities were public bodies: the government had direct influence on their management and supported their activities via core funding, which covered the universities' costs. The universities' heads had to report to the respective ministry. At the same time, university professors enjoyed academic freedom to ensure critical and independent research (Kivistö 2008). However, in recent decades particularly the funding of universities has changed in many countries (Auranen and Nieminen 2010). First, governments have started to relate funding to performance by introducing performance-based funding systems (e.g. Geuna and Martin 2003; Hicks 2012). This implies that universities receive (part of) their core funding based on performance indicators, such as publication output, third-party research funding, or the number of Ph.D. students (for an overview of performance indicators see OECD 2010). The underlying idea is that funds should flow to institutions that perform in order to reward output instead of input (Herbst 2009). Second, third-party funding from public as well as private sources (also referred to as external funding) has gained considerable importance. As Auranen and Nieminen (2010) point out, public sources comprise grants by public funding agencies and contracts with public authorities. Particularly public funding agencies have a science policy steering function and can therefore—together with core funding—be used as steering instruments by the government. Private sources include contracts with the private sector (Auranen and Nieminen 2010). The increasing importance of funding from private sources can be attributed to the pressure that has been put on universities from the late 1970s onwards to intensify their collaboration with firms and to foster applied research (Muscio et al. 2013).

These changes in university funding systems have originated from the Anglo-Saxon countries and have spread to many university systems around the globe and to diverse disciplines, including natural sciences and engineering, humanities, social sciences, and economics. Strehl et al. (2007) find that the majority of European universities is funded by the state with a funding proportion ranging from 60 to 90% of the university's overall budget. In all countries under review, the importance of third-party funding has increased, even though the roles of various sources of third-party funding differ according to the country context (Strehl et al. 2007). The question which impact these changes will have on the individual and the societal level and whether the various sources of funding are interrelated has received considerable scholarly attention. Earlier research suggests that the relationship between core funding and third-party funding is complimentary rather than substitutional: core funding complements funding from private research contracts and consultancies and can therefore play an important role in fostering the collaboration between universities and firms (Muscio et al. 2013). Regarding the impact of these changes, several authors argue that changes in resource allocation affect research productivity. However, both theoretical and empirical evidence is ambiguous (e.g. Bolli and Somogyi 2011; Cherchye and Abeele 2005; Geuna and Martin 2003). Moreover, the growing importance of third-party funding may also lead to an increased competition not only among universities, but also among disciplines. While some disciplines may have considerable markets for research and consulting, and may attract a large number of students, others may neither have considerable markets for research or

consulting nor attract a reasonable number of students. The fear is that universities may therefore adopt a “mainstream” orientation (Strehl et al. 2007): they may decide to focus their research and teaching on topical (possibly short-lived) issues and the application-oriented needs of the industry to attract third-party funding and students (van Looy et al. 2004). Due to the differences between the various disciplines with regard to their ability to attract third-party funding it is necessary to focus on a specific discipline to analyze the role of third-party funding.

2.2 The Austrian context

Austrian universities still rely on the Humboldtian idea of independence of research and teaching, although a paradigm shift took place in 2004 when the new university act of 2002 entered into force (Trippel et al. 2015). The major aims of this reform were to increase the autonomy and responsibility of the universities and to improve their efficiency and effectiveness (Elias and Pöchlacker-Trötscher 2012). The new university act hence transformed universities into independent legal entities under public law. Thus, universities are no longer directly controlled and regulated by the state but have autonomy and full legal responsibility. Consequently, the relationship between Austrian universities and the state has changed noticeably. Each university negotiates with the government about the main part of its core funding and concludes performance agreements for a period of 3 years. These agreements include various performance criteria, such as research (e.g., research projects, number of publications), education (e.g., the minimum number of places offered in the respective study programs), societal objectives (e.g., increase in the number of women in managing positions), or measures to reduce the number of university dropouts. The remaining 5–10% of the universities’ core funding were allocated according to other criteria applying a specific formula until 2013. Since then, they have been allocated as structural funds, for which universities could apply in order to foster cooperation in research and teaching. In addition, universities are encouraged to acquire third-party funds to supplement their budgets (Strehl et al. 2007).

In 2011, the Austrian government set an ambitious goal—to become a leader in innovation within the European Union. This goal implies that Austria, as an economy, must increasingly develop new technologies itself instead of adopting them from others. One initiative to reach this goal is to support university research (BMBWF 2018). At the same time, the trend that university research is increasingly funded by external public and private funds can also be observed in Austria. The share of business-financed university research, for example, has increased significantly in the last 2 decades. Domestic companies tripled their funding between 1998 and 2013, rising from 1.75% to 5.1% of third-party funding. However, the possibility to obtain external funding from companies depends considerably on the presence of large, multinational companies. This might be the reason that in Switzerland, which is home to a large number of multinational companies, the share of third-party funding from companies is 10.9% (BMBWF 2018). In Austria, however, the lower possibility to generate third-party funding from companies due to the reduced number of large, multinational companies leads to greater competition in order to

obtain external funding and thus requires considerable efforts. Consequently, most universities have installed their own research advisory centers to professionalize the acquisition and processing of externally funded projects.

Even though the changes in resource allocation aimed at, for example, improving research performance (both regarding quantity and quality), increasing the universities' autonomy and transparency, and focusing on the students' needs and customer orientation (Steiner et al. 2013), they also involved unintended negative effects (Muscio et al. 2013; Strehl et al. 2007). The perceived negative effects in Austria are, amongst others, a loss of variety in research, an orientation to mainstream trends, and a loss of autonomy due to an increased dependence on third-party funding (Strehl et al. 2007).

The developments in university funding and the impact of these developments on the university's output highlight the importance of understanding the relationship between input (i.e., funding) and output (e.g., publications) to enable policy-makers to design effective and efficient policy measures and to avoid unintended consequences. The first step is to understand the funding structure and the role of various sources of funding. In the following, we will therefore explore the funding structure of Austrian universities and the role of third-party funding.

3 Data and methods

Data about funding was collected from four public universities in Austria that offer study programs related to business and economics: Karl-Franzens-University Graz (*KFU*), Johannes Kepler University Linz (*JKU*), Alpen-Adria-University Klagenfurt (*AAU*), and Vienna University of Economics and Business (*WU*). The four universities were selected to due to certain characteristics like age, size (number of students and number of employees), region as well as specialization. While three of these universities (*KFU*, *JKU*, *AAU*) comprise different faculties, such as natural sciences, social sciences, medicine or law, one university (*WU*) only has one faculty. The data were obtained from the data warehouse of the Austrian Federal Ministry of Education, Science and Research (BMBWK 2018). The main task of uni: data is the provision of up-to-date facts about the Austrian higher education sector.

KFU was founded in 1585 is divided into six faculties: "Faculty of Catholic Theology", "Faculty of Law", "Faculty of Business, Economics and Social Science", "Faculty of Arts and Humanities", "Faculty of Natural Sciences" and "Faculty of Environmental and Regional Science and Education". As the second oldest and second largest university in Austria, *KFU* is one of the most distinguished institutions with a comprehensive range of educational opportunities. Over 120 study programs are organized in these six faculties. In the winter term 2017, a total of 31,232 students (share of females: 61.1%) studied at *KFU*. The number of scientific staff during the same period of time was 1341.1 full time equivalent (FTE) (share of females: 42.0%), of which 175 FTE (13.05%) were professors. Almost 60% of all employees was scientific staff.

JKU was founded in 1966 and is one of the youngest universities of Austria. "Faculty of Social Sciences, Economics & Business", Law" and "Medicine", and three

schools, “JKU Business School”, “Linz Institute of Technology” and “Linz School of Education”, which have their own subject-specific departments. In the winter term 2017, 21,283 students (share of females: 50.33%) were enrolled in 19 bachelor programs and 37 master studies. At that time, the scientific staff amounted to 1016.3 FTE (share of females: 30.57%), of which 126.8 FTE (12.48%) were professors. In total, around 60% of all university employees work in research and teaching.

AAU was established in 1970. In total, 35 departments are spread across the university’s four faculties: “Faculty of Interdisciplinary Studies”, “Faculty of Humanities”, “Faculty of Management and Economics” and “Faculty of Technical Science”. The university offers 18 bachelor programs, 24 master programs, 10 teacher training courses, and 4 doctoral programs. In the winter term 2017, 11,644 students (share of females: 60.6%) studied at AAU. During the same period, the number of scientific staff was 456.6 FTE (share of females: 46.8%), of which 70.3 FTE (15.4%) were professors. Around 58% of all employees are hired as scientific staff.

WU was founded in 1898 and has eleven research departments. In addition, there are the six competence centers: “Emerging Markets and Central-Eastern Europe”, “Empirical research methods”, “Experimental research”, “Sustainability”, “Non-profit organizations and Social Entrepreneurship”, and “WU-Start-up center”. The number of students at WU amounted to 23,580 (share of females: 47.4%) in the winter term 2017. They could choose between two bachelor programs, 15 master programs and five PhD studies. In this semester, the total number of scientific staff was 766.2 FTE (share of females: 44.7%), of which 89.6 FTE (11.7%) were professors. In total, around 56% of all university staff (in FTE) work in research and teaching. Third-party funding has the highest priority for the university and is seen as an important source to supplement its core funding. Accordingly, it has professionalized the acquisition and the management of third-party funds. In the US, a common source of external funding is alumni (Potter 2008). Although this type of private funding is still in its infancy in Europe, also WU aims at fostering this source.

Overall, the universities included in this study differ considerably in terms of (1) founding year, ranging from 1585 to 1970, (2) size, with the number of students ranging from 11,644 (AAU) to 31,232 (KFU) and the number of scientific staff ranging from 456.6 FTE (AAU) to 1341.1 FTE (KFU),¹ (3) region, and (4) number of faculties.

Data obtained from the data warehouse of the Austrian Federal Ministry of Education, Science and Research relies primarily on the respective university’s intellectual capital reports and the university’s performance agreements. The Austrian university act of 2002 stipulates that universities have to prepare such reports on an annual basis. The first reports were prepared in 2005 and reported to the Austrian Federal Ministry of Education, Science, and Research. The content of these reports, however, was not harmonized and therefore differed a lot with respect to the information provided on sources of funding. Due to a directive that was issued in 2006 and determined the content of intellectual capital reports a common standard

¹ However, the share of scientific staff in the university’s entire staff is approximately 60% at all four universities.

that allows for comparing universities' sources of funding established by 2007. We therefore rely on data from 2007 to 2017 to track changes in the universities' funding structure and in third-party funding over time. In the figures below, we report baseline data (from 2007) as well as data from the last five available years (2013–2017). Regarding the sources of funding, we have data from fewer years because the level of detail and presentation changed over time and therefore limited the possibility to track developments. Hence, we are only able to analyze changes in the sources of funding that occurred between 2013 and 2017.

In our analysis, we differentiate between the university level and the faculty level (business and economics) to account for influences resulting from different disciplines. At university level, our benchmark is the respective university's core funds or the number of staff funded by core funds. As described above, core funds consist of funds distributed on the basis of performance agreements and structural funds. While the former are allocated on a yearly basis, the latter are allocated for a 3-year period. We thus divide the overall amount of structural funds by three and add them to the funds distributed on the basis of performance agreements in order to calculate the core funds for a specific year. Whenever possible, we rely on charts to better illustrate changes over time.

4 Findings

4.1 University level

At the university level, third-party funding may not only increase the university's overall funding but also its number of scientific and administrative staff, as additional funding may allow to hire further employees. In addition, it may also increase the university's assets, for example if a machine is acquired for a specific project. A lack of data, however, prevents us from analyzing this effect. In the following, we will therefore distinguish between the impact of third-party funding on the university's financial resources and on its human resources.

4.1.1 Impact of third-party funding on the university's financial resources

The government's increased focus to relate funding to performance reflects in the performance agreements that were concluded between each university and the government. All analyzed universities had specific targets with regard to the acquisition of third-party funding (Elias and Pöchlacker-Trötscher 2012). Interestingly, this only partially reflects in our findings. While the overall amount of third-party funding has increased in all universities between 2007 and 2017, the development of shares of third-party funding compared to core funding differs among universities.

In the first step, we explore the development of the overall amount of third-party funding. Figure 1 illustrates that all universities experienced an increase in third-party funding between 2007 and 2017. Interestingly, only WU shows a constant, albeit moderate, increase, whereas KFU, JKU, and AAU show increases as well as

Fig. 1 Overall amount of universities' third-party funding (in mn €)

Fig. 2 Change in universities' overall third-party funding compared to 2007 (in %)

decreases throughout the years. In Fig. 2, we relate the amount of third-party funding from 2013 to 2017 to the amount of third-party funding received in 2007 to calculate the percentage change. Again, our findings reveal an increase from 2007 to 2017. Interestingly, the smallest university in our sample, AAU, experienced the most unstable development in third-party funding.

In the next step, we explore the development of the share of third-party funding in the universities' core funding between 2007 and 2017. Our findings indicate that only two universities (KFU and WU) had a higher share of third-party funds in 2017 than in 2007, whereas the share of third-party funds was lower at JKU and AAU. Also, the development of the share of third-party funds between 2007 and 2017 does

not provide a clear picture. Especially in 2016 and 2017, the level of third-party funds relative to the university's core funds is lower than the years before at all universities. However, this might be explained by the increase in core funding that all universities received in 2016 due to the new performance agreements. In the following, we will take a closer look at each university:

KFU shows a steady increase in third-party funding from 9.3% in 2007 to 16.5% in 2015. In 2016, the share of third-party funding decreased to 13.9%. The intellectual capital report states that this development was due to non-periodic payments for EU-funded projects. In the following year, the share rose by approximately 8–15.0%, partly because of EU payments and partly because of newly acquired third-party funds from various funding organizations. The overall amount of third-party funding developed from € 14.1 mn in 2007 to € 26.9 mn in 2017 (University of Graz 2018a, b).

JKU has a considerably higher level of third-party funding than the three other universities, ranging between 24.4% in 2016 and 35.2% in 2013. Interestingly, the share of third-party funding decreases continuously between 2013 and 2015 (from 35.2 to 33.1%) and then drops sharply to 24.4% in 2016. As at *KFU*, the reasons given for the decline were non-periodic payments by the EU. However, in 2017 the start of the EU Horizon 2020 program led to a reversal of this trend, with the share of third-party funding increasing to 24.7%. The comparison of the overall amount of third-party funding in 2007 (€ 23.9 mn) to 2017 (€ 31.9 mn) shows an increase throughout the years (Johannes Kepler Universität Linz 2018a, b).

AAU shows a mixed picture when looking at the share of third-party funding. We see a sudden drop in third-party funding from 19.7% in 2013 to 13.6% in 2014. Although the level of funding slightly recovers in the following year (increasing to 16.6%), it decreases in 2016 and 2017 to reach 12.3%. Unfortunately, *AAU*'s intellectual capital reports do not provide any reason for this decline (Alpen-Adria Universität Klagenfurt 2018a, b). However, compared to 2007 (€ 5.7 mn) the total amount of third-party funding increased to € 6.9 mn in 2017. As *AAU* is the smallest university in our sample, non-periodic payments from funding institutions might also in this case explain the fluctuations.

At *WU*, the share of third-party funding is comparatively low, ranging between 10.3% in 2007 and 12.7% in 2015. However, *WU* is the only university in our sample that has only one faculty (social sciences). As the number of public funding programs in this field is rather low, the competition for receiving funding might be higher. According to the intellectual capital report, however, *WU* scores very well in the acquisition of funding programs compared to other Austrian universities (Wirtschaftsuniversität Wien 2018a, b). When looking at the development of the share of third-party funding, we observe a constant increase between 2007 and 2015 (from 10.3 to 12.7%) and the overall amount of third-party funding developed from € 6.7 mn in 2007 to € 13.2 mn in 2017. Interestingly, also at *WU* the share falls to 10.1% in 2016 but rises again to 10.9% in 2017.

Figure 3 provides an overview of the share of third-party funding compared to core funds between 2013 and 2017. The year 2007 serves as a benchmark.

Fig. 3 Share of third-party funding in the university's core funding

Regarding the funding sources great differences among the universities can be observed. Each university seems to have different focus on third-party funding and acquire different amount of research money from different sources.

The most important funding source for *KFU* is the Austrian Science Fund (FWF) followed by third-party funding from the European Union. Companies play only a marginal role as additional funding source (5.2%).

JKU has a strong focus on "Engineering and Natural Science". This might be the reason that FFG, a mainly federal supported fund, is the most important source for third-party money (29.7%), as the fund has similar funding foci. Besides the FFG also the Austrian Science Fund (22.9%) as well as companies (17.3%) are important sources.

AAU's third-party funding is characterized by public sources with 23.1% coming from the state and municipalities and 16.5% coming from the European Union. Another important funding source are companies who provide 19.1% of the total gained third-party money.

WU's greatest amount of third-party money comes from non-defined 'other' sources (26.9%). The European Union provides 16.2% of the gained third-party funding followed by the Austrian Science Fund (15.4%).

Figure 4 summarizes the different funding sources of each university. To account for annual variations, we calculated the 5-year average from 2013 to 2017.

4.1.2 Impact of third-party funding on the university's staff

The Austrian university law (UG 2002) also obliges Austrian universities to publish an annual intellectual capital report following the legal reporting obligations. The impact of third-party funding on the university's staff in Austria is shown in Fig. 5.

Fig. 4 Average sources of funding from 2013 to 2017 (in %)

Fig. 5 Share of staff financed by third-party funding in the university's entire staff (in %)

It illustrates the share of employees financed by third-party funding in the entire staff (in FTE) of the four analyzed universities.

In three out of the four analyzed universities the general trend that third-party funded research is playing an increasingly important role can be observed. All universities except for AAU show an increase in the share of third-party funding from

2007 to 2013. In 2007, *AAU* shows the highest share of third-party funded employees with 21.0% compared to the other universities. Interestingly, the share of third-party funded employees in 2007 was also *AAU*'s highest share over the years. In 2015, *AAU* experienced the greatest decline in third-party funded staff. This was due to the fact that employees were hired for specific projects funded by programs from, for example, the EU or the Austrian Science Fund. In 2015, several of these projects were completed and new one were not yet started. Consequently, *AAU* had fewer third-party funded employees during this transitional phase. The decline was partly compensated again in 2016.

For all other three universities an increase in the proportion of third-party funded employees of the entire staff can be observed, with *JKU* showing the greatest rise from 2007 to 2013. The slight decrease in the following years might be an effect of the foundation of the faculty of medicine.

4.2 Faculty level (business and economics)

4.2.1 Impact of third-party funding in business and economics

In the literature section, we argued that pressure to obtain third-party funding does not only increase competition between universities but also between disciplines, and that it was therefore necessary to investigate the role of third-party funding for the respective discipline rather than the entire university. In the following, we will explore the role of third-party funding in business and economics.

Figure 6 illustrates the importance of third-party funding in business and economics for the university's overall third-party funding.

Interestingly, the share of third-party funding in business and economics plays a minor role at universities which have more than one faculty (*KFU*, *JKU*, *AAU*), ranging between 1.9 and 5.8% at *JKU*, and 6.8% and 15.8% at *AAU*. This is because traditionally, higher funds flow into natural sciences, medicine and health sciences, and technical sciences as can be seen by the strong decrease of the percentage when excluding non-business and economic disciplines. In 2007, the share of business and economics in *KFU*'s overall funding was 3.2% (equaling to € 0.46 mn). This share increased considerably until 2015 (9.9%), only to drop to 6.6% in 2016 and recover again 1 year later, amounting to 9.4% (equaling to € 2.54 mn). At *JKU*, the share of third-party funding from business and economics increased from 1.9% in 2007 to 5.8% in 2014. Although it decreased to 4.0% in 2017, *JKU* still received a total amount of third-party funding in this field of € 1.26 mn. *AAU* has a comparatively high level of third-party funding in business and economics in 2007 (12.8%), which plummets in 2013 (6.8%) and then constantly increases to 15.8% in 2016. In 2017, however, it decreases again to 11%. Interestingly, although *AAU*'s share of third-party funding in business and economics is still comparatively high in 2017, the absolute amount (€ 0.75 mn) is lower than that of *KFU* and *JKU*. As *WU* has only one faculty (social sciences), it is not surprising that the share of third-party funding from business and economics is very high. Between 2007 and 2017, it has a

Fig. 6 Third-party funding in business and economics compared to the university's overall third-party funding

relatively constant level of 74–76%, with the only exception being 2015, when it decreases slightly to 70.4%.

To allow for a better comparison of the four universities despite their different number of faculties we will now analyze the share of third-party funding in business and economics as compared to social sciences (Fig. 7).

Overall, the importance of third-party funding in business and economics increased at all universities analyzed between 2007 and 2017. However, there are large differences between the universities. Whereas the share of third-party funding in business and economics nearly or more than doubled at *KFU* (2007: 23.9%; 2017: 44.1%) and *JKU* (2007: 21.9%; 2017: 51.1%), it increased only slightly at *AAU* (2007: 19.2%; 2017: 25.4%) and *WU* (2007: 74.1%; 2017: 75.3%). Interestingly, *WU* still has the highest share of third-party funding in business and economics, followed by *JKU*, *KFU*, and *AAU*.

4.2.2 Differences in funding sources

In Austria, the sources of third-party funding are heterogeneous regarding both public sources (e.g., ministries, local authorities) and private sources (e.g., firms, foundations). Both public and private sources are not only interesting to investigate at university level but also at faculty level. Unfortunately, a lack of data prevents us from analyzing the sources of funding at faculty level in the same depth as at university level (see Fig. 4). However, the data available allows us to explore the geographic origin of third-party funding. The following figure provides an overview of the sources of third-party funding (national, EU, third countries) that *KFU*, *JKU*,

Fig. 7 Share of third-party funding from business and economics in third-party funding from social sciences

AAU, and WU receive at university level and at the faculty of business and economics. To account for annual variations, we calculate the 5-year average from 2013 to 2017 (Fig. 8).

At university level, KFU received on average 83.8% of its third-party funding from national sources, 14.8% from EU members states, and 1.4% from third countries between 2013 and 2017. KFU's most important source of national funding is public comes from the Austrian Science Fund, amounting to an average of € 13.6 mn between 2013 and 2017. This corresponds to more than half of the university's third-party funds during that period (53.4%). Another source of public national funding is the Austrian Research Promotion Agency (2013–2017: 4.4%). Private national funding is mainly from firms and accounts for 5.2% of the university's third-party funds on average. At the level of business and economics, the average share of funding from national sources is slightly higher (86.9%), whereas funding from EU members states (12.6%) and third countries (0.4%) is lower. Interestingly, the share of funding from national sources decreased considerably between 2013 and 2017 (from 97.4 to 82.5%), whereas the share of funding from EU sources increased from 2.6 to 16.6% during the same period.

JKU shows a very similar picture as KFU at university level: between 2013 and 2017 it received on average 83.0% from national sources, 15.0% from EU members states, and 2.0% from third countries. During this period, its most important public national sources of funding were Austrian Research Promotion Agency (29.7%), and the Austrian Science Fund (22.9%). Firms contributed with 17.3% to the university's third-party funding. At the level of business and economics, national funding played a more pronounced role than at university level (91.4%). Compared to the other three universities, funding from EU members states played a minor role (7.0%

Fig. 8 Average funding structure from 2013 to 2017 at university level and at faculty level

between 2013 and 2017). Third-party funding from countries outside the EU was only acquired in two out of 5 years (in 2015 and 2016). When looking at the development of the shares of the various sources of funding, again it shows that between 2013 and 2017 EU funding increased dramatically (from 0.4 to 12.4%) and national funding decreased (from 99.6 to 87.6%).

AAU has a lower level of third-party funding from national sources (77.0% between 2013 and 2017) and a higher level of funding from EU members states (21.6%) than KFU and JKU. This might also explain why funding from Austrian Science Fund (2013–2017: 14.0%) and Austrian Research Promotion Agency (2013–2017: 7.5%) plays a minor role at AAU. At the level of business and economics, national funding is still the major source of funding (63.0%) between 2013 and 2017 but it is considerably lower than at university level. Correspondingly, the share of funding from EU members states accounts for 34.2% on average. Again, third-party funding from third countries plays an insignificant role (2.8%).

At university level, WU shows a very similar picture as AAU: 75.5% of its third-party funds came from national sources between 2013 and 2017, 21.9% from EU members states, and 2.6% from third-countries. The largest share of public national funding came from Austrian Science Fund (2013–2017: 15.4%), followed by Austrian Research Promotion Agency (2013–2017: 3.8%). Approximately 11% of third-party funds were obtained from firms. At the level of business and economics, the share of third-party funding from national sources corresponds to the university level (2013–2017: 75.5%). Interestingly, the share of funding received from EU member states is slightly higher at the level of business and economics (2013–2017: 23.8%), whereas the share of funding received from third countries is lower (2013–2017: 0.7%).

5 Discussion and conclusion

This paper aims at exploring the role of third-party funding at Austrian universities between 2007 and 2017. The results from our analysis indicate that the funding structures of Austrian universities have changed over time, albeit not always as expected. The data clearly indicates that the overall level of third-party funding has increased over the last decade. However, we can see that universities developed differently over time with regard to the share of the respective university's third-party funding in its core funding. At university level, *KFU* and *WU* experienced an increase in the share of the university's third-party funding in its core funding, whereas this share slightly decreased at *JKU* and *AAU* in the last 5 years. The reasons for the increasing and decreasing shares of third-party funding may differ for each university but a lack of data unfortunately prevents us from analyzing the reasons underlying these developments in more detail. Interestingly, the level of third-party funded employees compared to employees funded by core funds does not always correspond to the level of third-party funding (in monetary terms). Both *KFU* and *JKU* have higher levels of third-party funded employees, which might reflect the comparatively lower rank positions of project staff. It is important to note that the level of third-party funding and third-party funded employees varies considerably in some of the years at some universities. A reason for these fluctuations might be non-periodic payments from funding institutions. As these fluctuations make it difficult to compare data in single years, we suggest analyzing data over a longer period of time.

At faculty level, the share of third-party funding at the faculty of business and economics compared to the university's core funding increased at three universities (*KFU*, *JKU*, *WU*). However, the overall level of third-party funding in this faculty is still rather low, particularly at *JKU*. When comparing third-party funding for the faculty of business and economics to the faculty of social science's funding, all universities record an increase. These results allow for two interesting conclusions: First, although there is no clear indication that third-party funding has gained importance at university level over time, it has become more important for the faculty of business and economics. One of the reasons for this development might be a change in the faculties' strategies regarding third-party funding. To increase the number of submitted proposals for third-party funding a lot of faculties have started to offer trainings and financial support for faculty members to develop proposals for competitive research grants. Second, empirical studies on the role of third-party funding need to focus on a particular field or faculty to track changes over time, because counter-directional developments in different fields or faculties might otherwise be masked.

Our results show that the impact third-party funding has at faculty and university level also depends on the size of the respective university. Whereas individual, externally funded projects will in general have low impact on the share of third-party funding at larger universities, the same projects may have considerable impact at larger universities. This also reflects in our findings: *KFU*, which is the largest university in our sample both with regard to the number of students and the number of scientific employees, shows comparatively low changes in the level of third-party

funding (irrespective of the level of analysis). In contrast, AAU—the smallest university in our sample—experiences substantial changes in the level of third-party funding. In addition, the size of the university will also affect the riskiness of third-party funding. This is because writing proposals to funding institutions is time-consuming, the chances for the proposal to be successful are slim, and even if the project is funded the time lag between submitting the proposal and starting the project may be considerable. Consequently, time to generate research output is missing, which influences the future allocation of core funds, as they are based on the university's performance. Universities also compete with each other to obtain funding from public as well as private sources. Funding from private companies requires that universities do not only build a good reputation within the research community, but also within the private sector. This implies that they have to establish a track record and get in contact with companies that are willing to collaborate and able to fund projects.

In a nutshell, our research indicates the increasing importance of third-party funding in business and economics. For research, our paper highlights the importance of focusing on a specific faculty or field to avoid distortions due to differences in the availability of funding opportunities and way funds can be spent. It also shows that the non-periodic allocation of funds by the funding institution makes it necessary to use longitudinal data. For policy makers, our results indicate the importance of adapting policies to their own systems, accounting for the political and systemic environment (Auranen and Nieminen 2010). This requires an understanding of the funding structures as well as of the relationship between funding structures and output.

This paper gives insight into the funding structure of Austrian universities and its change over time. We used secondary and publicly available data for this analysis. We saw that most data relating to the funding structure is only available at university level but not at faculty level. To obtain a deeper understanding about differences of third-party funding and the development of third-party funding over time, it is necessary to have more specific and fine-grained data at faculty level and at the level of research institutes. Such data would also allow to consider the university's, faculty's and research institute's funding strategies. As these strategies likely differ among research institutes, they will also impact the funding structure at the various levels. Therefore, future research on third-party funding should consider these diverse funding strategies and research approaches and focus on the institute or department level instead of the university and faculty level. As we now know that there are differences in the structure and sources of third-party funding, future research should also investigate the relationship between these aspects and research output. This would provide insight if the various sources of third-party funding actually increase research performance. Lastly, this research focused on the specific Austrian public university context. It would be interesting to compare our results with other countries and university systems to learn about how context influences third-party funding. Notwithstanding these limitations, the paper represents a promising step toward explaining the role of third-party funding at Austrian universities.

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