

**Title**

Urban policies and the competition for academic talent: Vienna and Munich in comparison

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**Abstract**

Human capital is the main source of regional economic growth in knowledge economies. Hence, international mobility of human capital in general and of academic talent (students and university researchers) in particular has been receiving increased attention from economic research and policy-makers. This paper presents a framework for urban policies – referred to as brain competition policies - which aim to attract international academic talent. Policy actions and developments in Vienna (Austria) and Munich (Germany) are identified, described and systematically compared. Empirical data which allow us to evaluate these policies to a certain extent are presented. Vienna already has quite a comprehensive brain competition policy and has successfully attracted international students and professors, whereas Munich is less developed in this direction. In both cities, however, regional policies to attract academic talent can be further developed in a way that recognises the importance of a comprehensive and strategic approach.

**Keywords**

Academic talent, mobility, urban policy, cities, human capital.

## 1. Introduction

Issues of economic growth are high on the agenda of national and regional policy-makers. One powerful engine for economic growth is human capital. Several factors such as skill-biased technological change and ageing have provoked a locational competition for human capital. National and regional policy-makers respond to this competition with measures to improve the attractiveness of their regions and institutions as magnets for national and international talent (Wildavsky, 2010; Reiner, 2010). The paper explores the economic rationale for urban policy-makers to attract internationally mobile academic talent, presents a policy framework referred to as brain competition policy (BCP) and critically investigates implemented policies from a comparative perspective (Lim, 2010; Huggins, 2010). The focus lies on the mobility of international academic talent (students, postdocs and professors) as one important fraction of human capital. International academic talent is a specific factor for economic success in a globally connected and multicultural world of innovation and business because of positive externalities emanating from knowledge spillovers and diversity (Tripl and Maier, 2011).

The city of Vienna (Austria) and the city of Munich (Germany) serve as empirical cases for investigating urban BCP and its potential effects. Vienna and Munich serve as appropriate and interesting cases for comparison because (1) labour market studies and anecdotal evidence suggest that they are close substitutes as locations for mobile academic talent; both are (2) embedded in a complex federal system of a coordinated market economy, (3) located in central Europe, (4) German-speaking, (5) economically strong and (6) have a similar research environment dominated by a large classical university and a technical university surrounded by public research institutes based on similar academic traditions.

The guiding research questions are, firstly, which policy options and policy designs for attracting international academic talent are available from a conceptual point of view? Secondly, what brain competition policies are in place in Vienna and Munich to attract international academic talent and what factors may explain regionally differentiated policy designs? Thirdly, how do the cities of Vienna and Munich perform in terms of attracting international academic talent? Fourthly, how important are brain competition policies as part of a wider urban policy portfolio and do they impact in a significant way on the competitiveness of cities for attracting international academic talent?

Our contribution to the literature lies in the conceptualisation and empirical investigation of an emerging policy field with increasing importance for regional and urban policy-makers. Additionally, we undertake case studies for two central European cities, thus complementing the US-dominated literature with additional evidence. Finally, by adding a comparative dimension, the paper contributes to the ongoing process of (regional) policy learning and delivers relevant insights into the design and evolution of regional innovation policies, of which BCP is an important element. Associated methodological problems in comparative regional and urban policy analysis are discussed.

The paper is structured as follows: Section 0 presents a policy framework for urban policies being pursued to lure academic talent from abroad. Section 3 presents and compares the BCP of Vienna and Munich as well as their relatedness and complementarity to policy actions at the national and European level. Empirical evidence on the internationalisation and diversity of academic talent in both cities is provided in Section 4. The final chapter concludes and suggests ideas for further research and policy development.

## 2. Conceptual policy framework

Policy-makers on different spatial scales aim to accelerate economic growth. Traditionally, urban and regional policies have attempted to achieve this goal with several forms of subsidies for physical capital investments such as infrastructure projects or inward investments of extra-regional firms (Markusen, 2008). However, this focus of regional public policies on improving conditions for physical capital investment seems increasingly questionable and empirical research points to several advantages of a more human capital-centred approach (Blair, 1995; Florida, 2007; Glaser, 2011).

Theoretical and empirical work in economics shows that human capital is one of the main forces driving knowledge diffusion innovation, urban and regional economic growth, and structural change towards knowledge-intensive business sectors (Lucas, 1988; Nijkamp and Poot, 1998; Florida, 2002; Aghion and Howitt, 2006; Glaeser, 2011; Stehrer, 2010). Human capital may also vary with respect to cultural diversity, an issue that has gained importance under increasingly globalised migration flows. Empirical studies confirm positive net effects of cultural diversity on economic performance in general and innovation performance in particular (Ottaviano and Peri, 2006; Niebuhr, 2009; Audretsch et al., 2010). Mobile academic talent, i.e. students, postdocs and professors, are a small but very important fraction of human capital. The effect of international students on economic performance depends on the stage of their study. Before graduation, they contribute to aggregate regional demand due to spending on tuition fees, housing, food etc. Additionally, and perhaps even more importantly, international students foster the development of a creative milieu and a multicultural and open climate in the host city. After graduation, they may enter the urban labour

market and increase the diversity and supply of highly skilled workers (Faggian and McCann, 2009). From a public policy point of view, attracting international students who enter the local labour market after graduation is often considered an optimal policy because private and social costs emanating from integration and recognition of certificates are minimised (Zimmermann, 2008). University researchers, i.e. postdocs and professors, have a positive impact on economic growth due to different forms of knowledge spillovers, for example in the form of contract or collaborative research with regional firms or via academic entrepreneurship (Schiller and Revilla Diez, 2010; Baba et al., 2009).

Hence, the well-established argument in the literature is that regional and urban policies should be redirected towards human capital policies which favour, for example, the upgrading of the “people climate” instead of the “business climate” (Mathur, 1999; Batey, 2002; Florida, 2002; Carneiro and Heckman, 2003; Markusen, 2008; Reiner, 2010). This shift in urban and regional policy is, of course, a gradual one because physical and human capital are complements and not substitutes; too one-sided strategies are likely to produce costly policy failures (Grilliches, 1969).

Two types of human capital policies can be distinguished: internal human capital accumulation and external human capital attraction. Both policies increase the stock of human capital and economic growth, whereas a brain drain may reduce the growth potential of a regional economy. In the past, national and regional governments have relied primarily upon internal human capital accumulation, but recently, a paradigm change in policy-making that also places emphasis on external human capital attraction is observable (Straubhaar, 2001).

The main reasons for human capital attraction policies gaining importance are the increasing scarcity and mobility of highly skilled individuals. The scarcity results from

the soaring demand for highly skilled workers in the emerging knowledge economy and an ageing process which has already reduced the supply of human capital in some states and regions (Faggian and McCann, 2009; Acemoglu and Autor, 2012). Together, these developments result in a locational competition between jurisdictions for mobile factors in general and human capital in particular (Tiebout, 1965; Malecki, 2007; Reiner, 2010; Wildavsky, 2010). This competition is increasingly between cities for two reasons: firstly, urban areas harbour universities, and urban labour markets are characterised by a higher relative demand for highly skilled individuals. Secondly, national barriers for mobility have already been abolished (for the EU27 countries) or substantially reduced (for the highly skilled from non-EU27 countries), which increases *ceteris paribus* the importance of other, often highly localised factors (Florida, 2007).

Internal human capital accumulation policies and external human capital attraction policies can be rationalised on the basis of market failures in the market for education and the labour market (Laranja et al., 2008). Milton Friedman (1962) argues that the benefits of education accrue not only for the educated individual but for the broader society because education contributes to social welfare “by promoting a stable and democratic society” (Friedman, 1962 86). A similar argument applies for human capital attraction strategies. Knowledge diffusion, stemming from human capital mobility, represents a positive externality and results in a socially suboptimal level of spatial knowledge diffusion and mobility (Bretschger, 1999).

Reiner (2010) provides a policy framework for human capital policies referred to as brain competition policies (BCP). BCP encompasses policies for the attraction, retention, education and utilisation of human capital in general and academic talent in particular. BCP can be understood as part of a wider set of regional competitiveness policies, which, according to Potter (2009 992) comprises “policies that have as a

principal objective the aim of influencing regional competitiveness seen in terms of the capacity to attract and retain mobile factors and associated economic activity.” BCP provides a general policy framework, whereas observed policies show different designs and sometimes no explicit BCP-strategy exists. It is built upon theories that explain mobility and location decisions of human capital, just as monetary policy is based upon monetary growth theory. There are, of course, numerous different factors at work depending on the type of human capital in question (Asheim and Hansen 2009). Regarding academic talent, it is useful to distinguish between students and university researchers, although soft location factors such as housing (Glaeser, 2005; van Geenhuizen and Nijkamp, 2007), amenities (Knapp and Graves 1989; Glaeser, 2011), tolerance or low entry barriers to urban society (Florida, 2002; 2007) are of relevance for both groups.

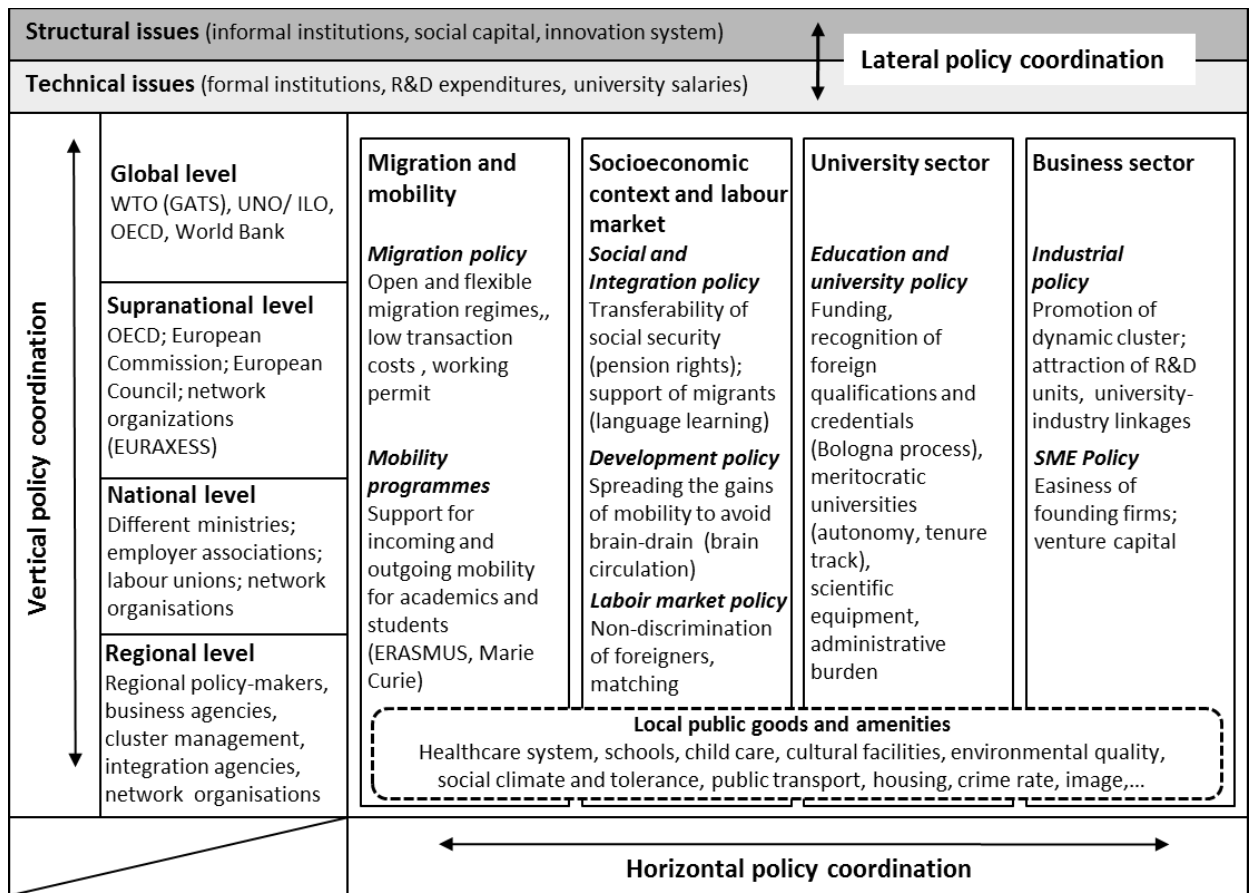
Students’ choice of a particular university and city can be understood as a decision made in the context of uncertainty. Equally important for the urban economy is the decision of the student after graduation to enter or not to enter the regional labour market. Empirical research has identified a number of push and pull factors which are the main determinants of these location choices. We will concentrate here on pull factors, because policy-makers interpret them as location factors suitable for policy intervention. Descriptive analysis from the OECD (2011) shows that - inter alia - English as a language of instruction, tuition fees, cost of living, immigration policy, mobility programmes and the quality of university courses are important. The importance of quality considerations is also corroborated by econometric evidence for the EU and OECD countries (van Bouwel and Veugelers, 2009; Brezis and Soueri, 2011). The decision to enter the regional labour market after graduation is less well researched, but labour market economists and common sense suggest that labour market regulations

regarding entry, job opportunities, matching between required qualifications and labour market demand, relative wages, unemployment rates and living conditions are important issues (Borjas, 2010).

Research on the mobility decisions of professors and postdocs shows that wage differentials are of less importance compared to other groups of highly skilled employees such as managers or engineers (Mahroum, 2000). More important pull factors are the proximity to “star scientists”, institutional prestige, research environment, degree of autonomy, research infrastructure, career opportunities and meritocracy (tenure track), and English as the main language (Reinstaller et al. 2012; OECD 2008; Solimano 2008). The technology intensity of the regional business sector and entrepreneurial opportunities may be important determinants for postdocs also considering a career as a corporate researcher or for academics working in scientific fields which depend heavily on industry funding, such as pharmaceuticals (Thorn and Holm-Nielsen 2006). Potentially important conclusions for policy-makers are provided by the analysis of mobility barriers for university researchers. A recent survey of European university researchers reveals that the availability of childcare facilities as well as affordable housing is important (Reinstaller et al., 2012).

The policy matrix in Figure 1 sheds light on relevant policy fields and governance issues associated with the above-mentioned pull or location factors regarding the attraction of academic talent. What makes BCP a rather complex endeavour is the fact that each of these location factors is associated with several policy fields which are organised by different forms of multi-level governance (Sanz-Menendez and Cruz-Castro, 2005). Comparable with other emerging policy issues such as innovation policy, an increasing complexity of policy actions and strategies emerges cutting across several previously rather isolated policy fields.

Figure 1: A policy matrix for BCP



Source: adapted from Reiner (2010)

As a result of the complex governance structure, coordination tasks are an important part of BCP. Figure 1 highlights three of them: (1) vertical policy coordination at different spatial levels, (2) horizontal policy coordination between different policy fields typically associated with different ministries and institutions, (3) lateral policy coordination between structural issues and technical issues (Mahroum, 2005). Structural issues are shaped by tradition and culture (e.g. meritocracy, xenophobia, attitudes towards technology and research, etc.), while technical issues are under the direct control of policy-makers (e.g. immigration regimes, taxation, etc.). Of course, changing structural issues such as the level of tolerance in an urban society is complex and may take a long time.

Consideration of the different policy fields in Figure 1 suggests that, depending on the design of the federal system, urban policy-makers may be powerful in shaping some pull factors for academic talent more than others (Alecke et al., 2011). City councils probably have more power in integration and labour market policy or industrial and SME policy. In particular, they have direct control over location factors such as local public goods and amenities. Accordingly, “quality of life policies” (Glaeser and Kerr, 2010) to improve the quality of local public goods such as environmental quality, schools or childcare facilities may figure prominently on the agenda of urban BCPs. On the other hand, urban and regional governments also face several important institutional and financial constraints in undertaking BCP. For instance, migration issues are traditionally a core competence of the nation state. Another example are university policies, which fall predominantly under the responsibility of the national level, with the notable exceptions of the US, Germany and Switzerland. However, recent research in regional public policy suggests that - following a trend towards regionalisation and decentralisation in Europe - even in the case of migration or university policy, room to manoeuvre at the regional level exists (Sanz-Menendez and Cruz-Castro, 2005). There are already some regional elements present in migration policies, with regional entities defining which type of human capital should be granted preferred access to the regional labour market etc. (Burkert et al., 2007; Leo and August, 2009). This element of regionalisation characterises the Austrian ‘Red-White-Red Card’ as well as the already abolished German ‘Green Card’ (see below). Additionally, the realisation of the European Single Market with the freedom of movement for people from EU-27 countries reduced the importance of national migration rules significantly. Universities are increasingly influenced by regional policies and vice versa (Lawton Smith, 2007; European Commission 2011). Even though regional governments may fund only a small

share of the university budget, they can, for instance, incentivise specialisation patterns to match university research to business sector demand. In concluding this section on competitiveness policies for human capital, it is warranted to examine several welfare considerations. The main argument is that the city population is better off attracting mobile human capital because (1) economic growth will increase, (2) human capital-driven growth favourably impacts on public budgets because highly skilled individuals earn higher wages, pay more taxes and receive less social spending, and (3) inequality decreases as a result of complementarities between high and low-skilled employment and the compression of wages of the highly skilled (Chiswick, 2011). Locational competition for human capital and associated policies, however, also induces some adverse welfare effects (Peck, 2005). Firstly, empirical analysis sheds light on the dynamics whereby innovation-driven growth triggered by international academic talent increases localised wage polarisation as a result of a dual labour market for low-skilled and highly skilled workers (Lee, 2011). Secondly, tax burdens may be reduced for mobile human capital and redirected towards the immobile factors (i.e. low-skilled labour) or consumption. In the extreme case, redistribution via taxes becomes impossible and mobile human capital pays only a benefit tax. In Europe, however, important tax rates are traditionally set by the national government. Secondly, Borck (2005) points out that public spending might be distorted with asymmetric welfare impacts. Jurisdictions that attempt to attract mobile human capital will increase their relative spending on public goods that differentially benefit this group. For example, policy-makers may decide to “overprovide opera houses relative to public housing, since the former attract mobile workers while the latter does not” (Borck, 2005 490).

### 3. Brain Competition Policies in comparison

This section introduces case studies and analyses the BCP in Vienna and Munich in a comparative way. Limitations of comparable data occur due to the different categorisations of Munich (NUTS 3) and Vienna (NUTS 2) in European regional statistics.

Table 1 displays regional economic and innovation performance indicators for Vienna and Munich. Munich is more productive and R&D-intensive than Vienna, despite some catching up by the Austrian capital in the last two decades. Due to the relatively large and knowledge-intensive manufacturing base, the Munich region displays a higher number and share of R&D personnel and a higher number of patent applications. After 1945, Munich became a location for headquarters of multinational and R&D-intensive firms such as Siemens, BMW, Wacker Chemie and EADS. These firms play a very important role in the urban innovation system and attract international talent. Vienna, on the other hand, was a stagnant city until the 1980s with closed borders to traditional export markets in Eastern Europe. Economic dynamism returned and internationalisation increased only after 1989 with the collapse of communism in neighbouring countries and the new role of Vienna as a location for regional headquarters in a reunited Europe. Since then, Vienna has functioned as a hub between Eastern and Western Europe. This role is even visible in the flow of academic talent: outflows of Austrian academic talent are directed towards the US or the UK, whereas incoming talent is predominantly from Eastern Europe (Meyer et al., 2012).

Table 1: Indicators of innovation performance in Vienna and Munich 2009

	Vienna	Vienna Region <sup>1</sup>	Munich	Munich Region <sup>2</sup>
Population in 1,000	1,693	3,300	1,329	4,341
GDP pc in PPP <sup>3</sup>	38,977	-	57,749	-
R&D intensity	3.95%	2.98%	-	4.63%
Share of highly skilled workers	26%	-	-	33%
Share of R&D personnel of total employment	2.54%	1.50%	-	2.85%
Share of manufacturing employment <sup>3</sup>	8.4%	11.1%	-	14.6%
Patent applications to the EPO per Million inhabitants	61	60	242	244

<sup>1</sup>NUTS 2 Lower Austria and Vienna

<sup>2</sup>NUTS 2 Upper Bavaria

<sup>3</sup>2008

Source: Statistik Austria, Statistik München, Eurostat, Mayerhofer et al. (2010)

Policy analysis of BCP faces two methodological problems: firstly, it is difficult to identify relevant policy actions because they are very diverse and scattered among different policy actors and institutions. Secondly, a classification has to be developed which categorises possibly relevant policy actions as being part of or not being part of BCP. Regarding the first problem, we conducted extensive literature research on policy documents and complemented and validated the results using qualitative interviews with key policy-makers in Vienna and Munich. Concerning the second problem, we distinguish between “explicit” BCP, which pursue the goal of attracting academic talent, and “implicit” BCP, i.e. those policies which do not explicitly aim to attract international academic talent, but are assumed to be important from a theoretical and conceptual perspective. To add analytical content to the analysis, we attempted to apply some of the categories of the BCP framework and structured policy actions according to objectives, instruments and actors (Howlett et al., 2009). However, the methodological

problems necessarily compromise a clear-cut and comprehensive application of the conceptual framework. The multi-level governance of BCP is acknowledged by taking into account related policy actions at national and EU level. Importantly, Munich and Vienna have different functions and positions in the national federal system of Germany and Austria respectively. From a legal system point of view, Vienna is situated one level below the national state (NUTS 2) while Munich is already two levels below the national level (NUTS 3), and its competencies and resources are much more restricted. The federal state of Bavaria, of which Munich is the capital city, is the functional equivalent to Vienna. As a result, the public budget of Vienna (about 11.5 billion Euro) is more than twice the budget of the city of Munich (5.2 billion Euro). In order to account for these different positions of the two cities in the federal systems, we consider Munich and Bavaria together and compare their BCP to that of Vienna.

Additionally, university policy, one of the main channels through which policy-makers attempt to increase the attractiveness of their jurisdiction for international academic talent, is also organised in different ways in Austria and Germany. In Austria, universities are nationally funded and governed, whereas in Germany, federal states are responsible for university policy. As a result, Bavaria brings more leverage to bear on their universities than Vienna, which attempts to influence and complement national university policy via several instruments. Both factors lead to the conclusion that Munich and Vienna are characterised by different constraints regarding legal, political and financial latitude and resources. In the following section, we will discuss EU, national and urban policies and systematically compare urban BCP between Vienna and Munich.

EU level and national policies At EU level, several instruments were implemented to increase the attractiveness and competitiveness of Europe for native and foreign

academic talent. Examples include the Scientific Visa or the Blue Card scheme. The Scientific Visa enables third country residents to come to Europe if they are in possession of a signed hosting agreement from a European research organisation. The Blue Card Scheme more generally aims to attract talent to Europe. Talents from third countries must have a higher education qualification and a valid work contract or binding job offer in the EU to apply for the Blue Card. The Blue Card was introduced by Member States with room for amendments from national governments. An important driver of student and academic staff mobility is the European Erasmus programme, which has been in place since 1987, with 33 countries participating in 2012.

At the national level, Austria and Germany are characterised by a long record of restrictive immigration policies (Ette and Sauer, 2010; Reiner 2009). Both countries are characterised by relatively low shares of highly skilled foreign-born workers among the total foreign-born population compared to other OECD countries. In comparison to the share of highly skilled foreigners in Canada (38%), the UK (35%) or the US (26%), Austria (11%) and Germany (15%) seem to be rather unattractive destinations (Huber et al., 2010). However, both countries have attempted to improve their attractiveness for foreign talent recently. Austria founded Brainpower in 2004, a nationally funded service and information platform which supports international researchers and national expatriates intending to move to Austria. Similar vehicles exist in Germany (GAIN) or Switzerland (Swiss Talents). Furthermore, Austria introduced the Red-White-Red Card in 2011 to facilitate the immigration of qualified workers from non-EU countries according to personal and labour market-related point-based selection criteria (BMASK, 2010). Germany relaxed restrictions for selected migrant groups as well (Ette and Sauer, 2010). In 2000, the German “Green Card” for IT specialists was introduced, but was abolished again in 2003 (Bauer and Kunze, 2003). The number of applications and

assignments was disappointing due to unattractive conditions and weaknesses in the administrative system. The lack of competitiveness revealed in the attraction of foreign IT talent induced a broader discussion on migration policy in Germany. One outcome of this was the German Immigration Act which came into force in 2005 granting permanent residence and permission to work for highly qualified people with easier access to visas and a reduced burden of bureaucracy.

## **Vienna**

Vienna issued a research, technology and development strategy in 2007 which states explicitly the aim of increasing the locational attractiveness for academic talent. To this end, a number of instruments have been introduced which systematically foster the attraction of researchers at different stages of their careers (Table 2). Endowed professorships aim to attract international senior researchers working in fields of science corresponding to regional economic strengths. An international postdoctoral programme supports postdoctoral researchers developing their own research groups. There is also a programme to attract young international researchers to Vienna. Fellowship grants enable international researchers to spend several months at Viennese research organisations as guest researchers. Summer schools are financed to attract international students and PhD students.

The main actors for developing and implementing BCP policies are the city administration, the Vienna Science and Technology Fund (WWTF), the Vienna Business Agency and a Technology Promotion Agency (ZIT). Recently, the city government established an additional actor, the ‘delegate for university and research’, whose function is to make the city government more responsive to the needs of the urban universities and to act as an interlocutor between regional government and scientific

institutions. Some of the instruments and agencies are organised and financed in cooperation between Viennese, national and private institutions.

Besides the previously mentioned explicit policies for attracting foreign academic talent, urban policy-makers in Vienna have been applying a number of instruments which shape and upgrade soft locational factors for decades. While these policies are not actively promoted as part of a comprehensive BCP, they clearly increase the locational attractiveness of Vienna (implicit BCP). Important examples include housing policy, urban environmental policy or subsidies for cultural activities. Social housing policies, for instance, reduce upward pressures on rents, provide mixed neighbourhoods and reduce crime rates. Additionally, students from EU countries can apply for social housing under certain circumstances.

Vienna possesses the financial and, to a lesser degree, the legal power to set up agencies and instruments. This is partly due to the fact that Vienna enjoys the administrative status of a federal state. Policy-makers in Vienna deliberately engage and develop different explicit and implicit policy instruments which can be classified as being part of an emerging BCP. Most of the explicit policies are targeted towards international university researchers and much less towards international students. Nevertheless, the share of international students in Vienna is already high and student flows seem to be determined predominantly by national and EU policies (see below).

Table 2: Explicit brain competition policies in Vienna

	<b>Policy documents</b>	<b>Objectives</b>	<b>Instruments</b>	<b>Actors</b>
Vienna	<ul style="list-style-type: none"> <li>▪ Wiener Strategie für Forschung, Technologie und Innovation, 2007 (Research, Technology and Development Strategy for Vienna)</li> <li>▪ Migration, Mobilität, Vielfalt, 2010 (Migration, Mobility, Diversity)</li> <li>▪ Leitlinien der Wiener Integrations- und Diversitätspolitik, 2009 (Master profile for integration and diversity policy in Vienna)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Becoming one of the most important European R&amp;D metropolitan regions and the principle town for R&amp;D in Central Europe</li> <li>▪ Increasing attractiveness for the best minds</li> <li>▪ Developing an integration-oriented diversity policy</li> <li>▪ Easing the settlement of international highly qualified people and their families in terms of living, working and education</li> </ul>	<ul style="list-style-type: none"> <li>▪ Endowed professorships for international researchers funded for universities in Vienna</li> <li>▪ Vienna International Postdoctoral Programme (VIPS), 3-year postdoc positions for researchers in specific disciplines from abroad funded by the city of Vienna and the science ministry</li> <li>▪ Research Groups for international young investigators to develop a research group</li> <li>▪ Fellowships Grants for international senior and junior research in humanities for short-term stays</li> <li>▪ Summer schools for young researchers</li> <li>▪ Regular diversity and integration monitoring</li> <li>▪ Information and service centre for foreign human capital (expat centre)</li> </ul>	<ul style="list-style-type: none"> <li>▪ City of Vienna:                             <ul style="list-style-type: none"> <li>- Administrative Group of Finance, Economic Policy and Vienna Public Utilities</li> <li>- Administrative Group for Cultural Affairs and Science</li> <li>- Administrative Group for Integration, Women's Issues, Consumer Protection and Personnel</li> </ul> </li> <li>▪ Delegate of the city of Vienna for University and Research</li> <li>▪ Vienna Science and Technology Fund (WWTF)</li> <li>▪ Technology promotion agency of the city of Vienna (ZIT)</li> <li>▪ Vienna Business Agency</li> <li>▪ Vienna Migration Commission</li> <li>▪ Regional employment agency, chamber of commerce, labour unions</li> </ul>

Source: Stadt Wien 2007, Wiener Zuwanderungskommission, 2010; Stadt Wien, 2009

Table 3: Explicit brain competition policies in Bavaria and Munich

	<b>Policy documents</b>	<b>Objectives</b>	<b>Instruments</b>	<b>Actors</b>
Bavaria	<ul style="list-style-type: none"> <li>▪ Koalitionsvereinbarung 2008-2013, 2008 (Coalition agreement)</li> <li>▪ BayernFIT – Forschung, Innovation, Technologie, 2008 (Research, Innovation and Technology in Bavaria)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Attracting star scientists with Bavarian roots to return to Bavaria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Scholarships for international postdocs</li> <li>▪ PhD programme with strong international orientation (incoming and outgoing)</li> <li>▪ Scholarships for international PhD students for 3 years</li> <li>▪ Scholarships for researchers from strategic partner countries (China and India)</li> <li>▪ Scholarships for international students</li> <li>▪ Study programme for graduates from Eastern European countries at universities in Bavaria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Bavarian State Ministry of Sciences, Research and the Arts</li> <li>▪ Bavarian Research Foundation</li> </ul>
Munich	<ul style="list-style-type: none"> <li>▪ München – Stadt des Wissens, 2005 (Munich – city of knowledge)</li> <li>▪ Interkulturelles Integrationskonzept, 2008 (Intercultural integration concept)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Attracting and keeping talent in Munich</li> <li>▪ Establishing integration as a cross-policy field</li> </ul>	<ul style="list-style-type: none"> <li>▪ ---</li> </ul>	<ul style="list-style-type: none"> <li>▪ City of Munich: Department of Labour and Economic Development and Department of Social Affairs</li> </ul>

Source: Bayerische Staatsregierung, 2008; Landeshauptstadt München Referat für Arbeit und Wirtschaft, 2005; Landeshauptstadt München Referat für Arbeit und Wirtschaft, 2012; Landeshauptstadt München Sozialreferat, 2008; Christlich Soziale Union and Freie Demokratische Partei Bayern, 2008

## **Bavaria and Munich**

The current coalition agreement of the Bavarian government (2008-2013) foresees the development of new programmes to attract star scientists with Bavarian roots to return to Bavaria (Christlich Soziale Union and Freie Demokratische Partei Bayern, 2008 19). This has been turned into university performance contracts by the Federal Research Ministry (Bayerisches Staatsministerium für Wissenschaft, Forschung und Kunst, 2008). The Bavarian Research Foundation offers scholarships for international students, PhD students and postdoctoral researchers (sometimes only from strategically important countries such as China or India). However, the Bavarian programme on research, innovation and technology does not explicitly focus on the attraction of academic talent (Bayerische Staatsregierung, 2008).

The city government of Munich does not engage proactively in innovation policy (Table 3). In the annual economic report, it states that “active innovation policy is not a task of the urban municipality” (Landeshauptstadt München Referat für Arbeit und Wirtschaft, 2012 26). According to the city administration, this is also true for research policy and BCP in particular. Nevertheless, a few policy documents identify the attraction of talent and an increase of stay rates of international human capital in Munich as one of the strategic fields for urban policy (Landeshauptstadt München Referat für Arbeit und Wirtschaft, 2005). Hence, there seems to be some inconsistency in the policy design, as there has been no specific instrument or programme introduced to achieve these policy goals.

One of the reasons for the absence of an explicit and developed urban innovation policy in Munich is the restricted level of financial resources, which forces the city administration to focus solely on network and coordination activities of research actors (Fischer, 2011). Moreover, city officials emphasise that research organisations in Munich are financially and legally sufficiently powerful enough to introduce their own instruments. The University of Munich, for example, has introduced a dual career system for couples, especially from abroad,

which includes career and integration services (e.g. career coaching, information on employers in the region, search for housing, search for childcare etc.). Furthermore, a number of endowed professorships are sponsored each year by companies, which reflects the R&D intensity of the regional business sector. Like Vienna, Munich applies several policies which increase the attractiveness of Munich for international academic talent without being conducted under this heading. For instance, Munich introduced an intercultural integration concept in 2008 to utilise internationals better for the urban economy.

### **Comparison of urban brain competition policies**

The regional government of Vienna is conscious of the fact that BCP is important for the competitiveness of the urban economy. This is corroborated by the fact that the attraction of academic talent was integrated into strategic policy documents and involved the implementation of specific programmes. Furthermore, Vienna operates a number of implicit BCP such as housing or cultural policy.

Although the government of Munich pays attention to this issue, it decided not to develop BCPs actively. These are seen as the responsibility of universities and research organisations. Although the Bavarian strategy on research, innovation and technology does not state the aim of attracting international academic talent explicitly, Bavaria has introduced several instruments to attract international researchers.

Vienna and Bavaria apply explicit BCP for university researchers only. Students are generally not targeted by explicit policy actions. However, both cities perceive their policies on soft location factors such as amenities, tolerance or housing as being important for students in their location decision as well. Table 4 compares Munich and Vienna based on the results of the annual city ranking of The Economist Intelligence Unit (EIU) focusing on urban liveability and comparing soft location factors across 140 cities. It is led by the city of Vancouver and followed by Vienna, whereas Munich is listed at position 28. On a scale from

1-100 (100 corresponds to ideal), different aspects of liveability are measured: stability, healthcare, culture and environment, education and infrastructure. Munich ranks behind Vienna due to lower scores on stability (related to crime and violence), education and infrastructure (especially the regional and international linkages and the availability of housing). Results from previous Economist rankings and similar city rankings such as UNO Habitat (2012) or the Mercer Quality of Living Survey confirm the robustness of the presented results. Comparing the costs of housing, Vienna is cheaper than Munich, which is the most expensive city in terms of housing in Germany (UBS, 2012; Döll and Stiller, 2010).

Table 4: Soft factors for the attractiveness of cities according to the EIU Global liveability survey

	<b>Vienna</b>	<b>Munich</b>
Liveability rank (out of 140 cities)	2	28
Liveability rating (1-100, 100=ideal)	98	93
Stability rating <sup>1</sup>	95	85
Healthcare rating <sup>2</sup>	100	100
Culture & Environment rating <sup>3</sup>	97	97
Education rating <sup>4</sup>	100	92
Infrastructure rating <sup>5</sup>	100	89

<sup>1</sup> Prevalence of crime, violence and terrorism

<sup>2</sup> Availability and quality of public and private healthcare

<sup>3</sup> Climate, corruption, censorship, social/religious restrictions, sports, culture and food/drink

<sup>4</sup> Availability and quality of public and private education

<sup>5</sup> Quality of public transport, quality of regional or international links, availability of good quality housing, quality of energy, water, telecommunication provision

Source: EIU Liveability survey 2010

However, the level of openness and tolerance is higher in Germany and Munich respectively.

The European Value Study (EVS) from 2008 revealed that Austria has the highest antipathy against foreigners, while Germany takes the eighth position out of 45 countries (Polak 2011).

A rather uneasy level of xenophobia is also mirrored in the city parliament in Vienna, where

27% of the delegates are members of the populist right-wing party FPÖ. In contrast, only 1.25% of the delegates in Munich belong to right-wing parties. A recent Eurobarometer survey on the quality of life in 75 European cities corroborated these results (European Union 2010). Out of the 75 cities, Viennese citizens, at 26%, show the second lowest approval rate on the question of whether foreigners are well integrated (Munich: 50%). As a reaction, the coalition government of the Social Democrats and the Green party has enacted several initiatives to increase the level of tolerance and openness in the urban society.

Comparing explicit BCP between the two cities, Vienna is much more active in this newly emerging policy field compared to Munich and Bavaria. Important explanations for this difference can be found in the distinctive historical trajectories of these cities and different national policies. Munich has been a well-established location for high-tech industries for decades, and local firms play an important role in the sponsoring of endowed professorships. On the national level, Germany and Austria spend roughly the same amount on tertiary education, but German universities can apply for additional funding from the “Exzellenzinitiative”, which is allocating significant resources primarily from national funds to selected universities between 2006 and 2017. The University of Munich (LMU) and the Technical University are two of the main beneficiaries of this initiative, which enables them to invest heavily in cutting-edge infrastructure and doctoral colleges.

Vienna, on the other hand, is still undergoing a catching-up process compared to Munich in terms of R&D intensity and GDP. So far, no established culture of private funding of firms for universities exists. Additionally, Austrian universities are in a continuous struggle to finance even their basic infrastructure and teaching obligations. The Austrian funding for excellence research is steered predominantly towards a few newly established research institutes, such as the Institute of Science and Technology Austria (ISTA) or the Institute of Molecular Biotechnology (IMBA). We hypothesise that the greater activism of the Viennese policy-makers

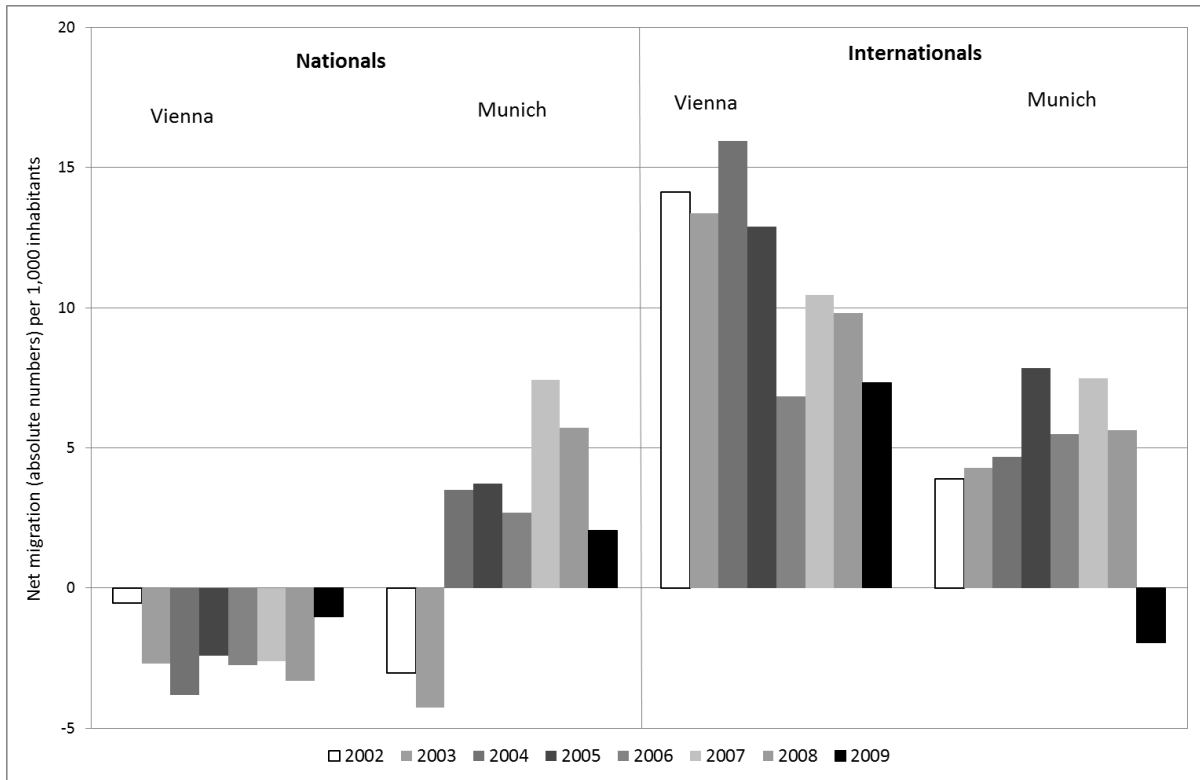
in BCP can be interpreted partly as a substitution process typical for catching-up processes, whereby policy-makers intervene with greater emphasis in the innovation system (Tripl and Tödtling, 2007). Another important explanatory factor is provided by the different role of Vienna in the federal system compared to Munich. Vienna has greater leeway regarding monetary resources and legal competencies.

#### **4. Empirical evidence on locational attractiveness for academic talent**

What are the outcomes of the policies described in the previous section? While it seems almost impossible to answer this question in a rigorous way, we attempt to apply some empirically informed intuition regarding the success of different policies. In doing so, we are aware of the fact that policies are only one factor which impacts on mobility and location decisions of academic talent. Due to data limitations in some cases, national data have to be used instead of regional data.

On an aggregate level, the increasing dependency of Vienna and Munich on internationals is obvious when looking at the share of international inhabitants over time. The share of foreigners in Vienna increased from 16% in 2000 to 22% in 2011. In Munich, the share of international inhabitants accounted for 23% in 2011, and has changed only slightly over time. The migration statistics of Vienna and Munich between 2002 and 2009 show a positive net migration of internationals. In Vienna, international migration has a positive balance, whereas national migration has a negative sign. In Munich, national and international migration has a positive balance, but international migrants account for the higher number (Figure 2).

Figure 2: National and international migration balance 2002-2009 in absolute numbers per 1,000 inhabitants



Data: Statistik Austria, Statistik München

Internationalisation of the labour force has also increased. Employment statistics reveal that the share of internationals employed is constantly rising in Vienna (Munich), starting in 2000 with 14% (21%) and rising to 19% (22%) in 2010. Munich and Vienna are the regions with the highest share of international employment in Germany and Austria respectively (Döll and Stiller, 2010).

Vienna (Munich) hosts nine (three) public universities. Most of the students study at the classical universities (University of Vienna, University of Munich) or the technical universities (Technical University of Vienna, Technical University of Munich). Table 5 illustrates the performance of the two largest universities in Vienna and Munich respectively. The University of Vienna is the largest German-speaking University with more than 90,000

students. However, the number of professors and budget per student are higher in Munich. The slightly better performance of Munich in terms of education can be confirmed by the Times Higher Education Ranking, where teaching indicators play a major role (30%). The Shanghai Ranking includes indicators which mainly mirror the research quality (publications, citations, Nobel Prize winners, etc.). Munich universities again perform better than Viennese universities. From this point of view, universities in Munich might be more attractive. Anecdotal evidence indicates that wage levels are quite similar between the University of Vienna and the University of Munich, but relative research infrastructure availability is better in Munich, to a large extent because of additional national public funding from the above-mentioned “Exzellenzinitiative”.

Table 5: University performance indicators 2011

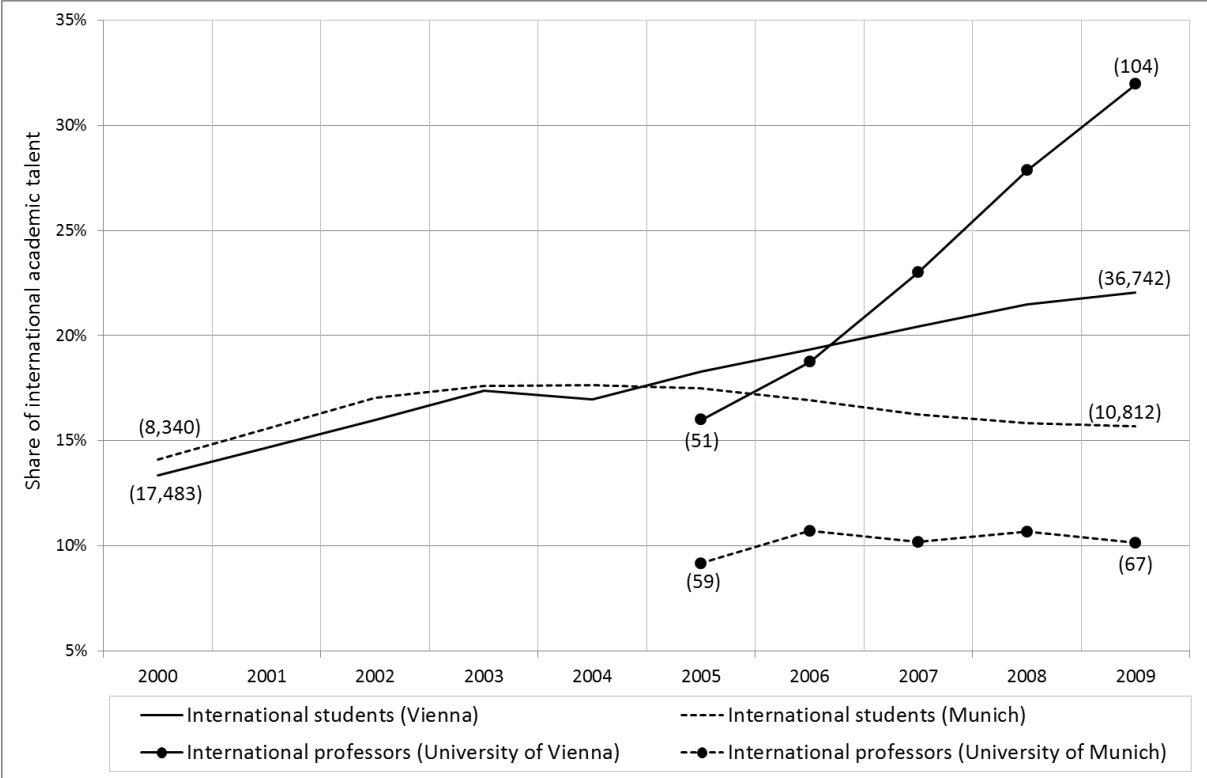
	Vienna		Munich	
	University of Vienna	Technical University Vienna	University of Munich	Technical University Munich
Number of students	91,362	25,838	49,180	31,023
Share of international students	25%	24%	14%	16%
Number of professors per 1,000 students	4.25	5.30	14.92	15.31
Budget per student	5,571	-	9,943	-
Position in Times Higher Education	139	301-350	45	88
Position in Shanghai Ranking	151-200	401-500	54	47

Source: University of Munich, Technical University Munich, University of Vienna, Technical University Vienna, Shanghai Ranking, Times Higher Education Ranking

Regarding the internationalisation of academic talent, Figure 3 presents the share of international students and professors in Vienna and Munich. In both cities, an increasing share of students is of foreign nationality: Between 2000 and 2009, their share increased in Vienna from 13% to 22%, whereas Munich shows a rise from 14% to 16%. In recent years, Viennese universities in particular have attracted an increasing number of students from abroad, mainly

from Germany, Italy, Turkey and Eastern European countries. The internationalisation of professors has also rapidly increased in Vienna. In 2005, about 16% (9%) of professors were of foreign nationality at the University of Vienna (Munich), but by 2009, this share had risen to 32% (10%). Again, most of the international professors at the University of Vienna come from Germany. Their share has increased strongly since 2005, whereas the share of professors of other nationalities has remained constant.

Figure 3: Share of international students and professors in Vienna and Munich



Data: BMWF uni:data, Destatis, University of Munich, University of Vienna

Although Vienna accounts for a large number of international students, they do not necessarily come to Austria in search of excellence in research and teaching, and their stay rates after graduation are relatively low. This argument is corroborated by the decisions of German students, which account for about one-third of foreign students in Vienna. Their motivation for choosing to study in Vienna depends on two factors: firstly, admission to German universities is generally restricted by a numerus clausus regulation, whereby only a

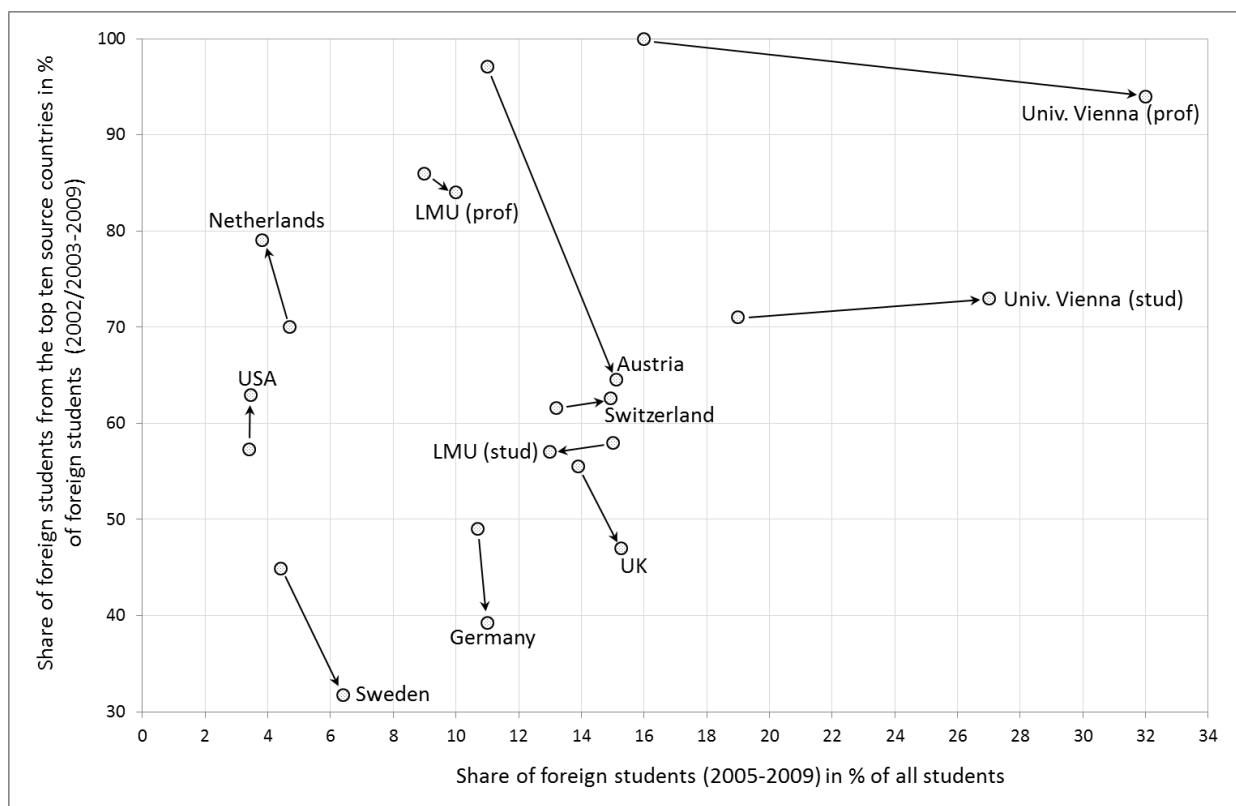
limited number of students with the best grades at school receive acceptance to study at a German university. This is not the case for Austrian universities, where German students who did not pass the *numerus clausus* are allowed to study anyway. Until 2005, the Austrian government restricted access to national universities for German students to those who passed the *numerus clausus*, but this regulation was abolished by the European Court of Justice because of concerns about discrimination between Austrian and international students. Consequently, a fraction of international students from Germany may represent a negative selection compared to those who study in Germany. Secondly, in some German states, including Bavaria, tuition fees must be paid, which is again not the case for Austria. Historical ties, cultural proximity and spatial proximity are additional factors which explain the large share of German students. Notably, none of these factors can be influenced by Viennese policy-makers. The general structure and size of student flows are determined by EU law and national university policies. If there is any measurable impact of urban BCP, it may be small and difficult to disentangle from other policies. In contrast to the German students, Eastern European students are attracted by the better education system and living conditions in Vienna compared to their home countries.

The decision of international students to stay after graduation reveals important elements of the attractiveness of a city. Statistics on the stay rate of non-EU graduates reveal that only 17% of students stay after graduation in Austria (OECD, 2011). This is low compared to Germany 25%, Canada 33%, Australia 30% or the Netherlands 27%. Although the Red-White-Red Card in Austria has allowed international graduates of Austrian universities originally from non-EU countries to stay for six months to find a job since 2011, the effect of this regulation in terms of number of applications (17% of international graduates mainly from Eastern Europe and Asia) is below expectations (BMASK, 2010). So far, only Master graduates can apply for the Red-White-Red Card, while Bachelor graduates are excluded.

Universities and the conservative party, as part of the coalition government, are lobbying for the extension of the card for Bachelor graduates, but the social democratic party and unions are against it (Die Presse, 2012a; 2012b).

The development of the share and diversity of international students for selected countries and the universities in Munich and Vienna differentiated according to students and professors is shown in Figure 4. For countries, data on international students are used. Diversity is measured as the share of international students from the top ten source countries, i.e. the higher the share, the lower the diversity. A high concentration on a few source countries might be interpreted as a sign of weaknesses in the competition for academic talent. Traditional migration nations such as the UK or the USA indicate a higher share of international students from a variety of countries. In 2002, Austria was characterised by a very high share of international students and a relatively low diversity. However, a substantial dynamic set in afterwards, and Austria has displayed a strong increase in the diversity of international students. Germany is characterised by high diversity and a lower internationalisation compared to Austria. The urban level mirrors the national picture in the sense that the academic talent at the LMU is more diverse than that of the University of Vienna, but its share is lower. Contrary to the national trend, diversity of students and professors at the University of Vienna shows only small signs of change. This can be explained by the strong increase in the number of German students and professors in this time span.

Figure 4: Development of the share and diversity of international academic talent (2002/2003/2005-2009)<sup>1</sup>



<sup>1</sup>LMU: University of Munich; Univ. Vienna: University of Vienna; prof: professor; stud: students

Data: Ederer et al., 2008; BMWF uni:data, Universität München, Destatis, OECD

## 5. Conclusion

International academic talent is a small but important fraction of human capital. We proposed a policy framework referred to as brain competition policy (BCP), which emphasises relevant policy fields for the attraction of international academic talent and governance issues. Several factors influence the mobility of academic talent, with some of them able to be influenced by urban policy-makers. This is especially true for soft location factors such as housing, childcare, or cultural events. For other policy fields, urban policies are constrained by their legal status in the national federal system. The horizontal coordination of actors of different policy fields and the vertical coordination of different policies carried out at different spatial levels are two of the main issues in developing a smart BCP.

Vienna and Munich, which serve as empirical case studies in our analysis, display quite different policy designs regarding BCP. Vienna is much more active in this newly emerging policy field compared to Munich and Bavaria. Important explanations for this difference can be found in the distinctive historical trajectories of these cities and different national policies. Munich has been a well-established location for high-tech industries for decades, and local firms play an important role in the sponsoring of endowed professorships. Vienna, on the other hand, is still undergoing a catching-up process compared to Munich in terms of R&D intensity and GDP, and no established culture of private funding of firms for universities exists. We hypothesise that the greater activism of the Viennese policy-makers in BCP can be interpreted partly as a substitution process typical for catching-up processes, whereby policy-makers intervene with greater emphasis in the innovation system. Another important explanatory factor is provided by the different role of Vienna in the federal system compared to Munich. The function of Vienna in the Austrian federal system is comparable to that of Bavaria.

Similarities between the BCP of the two cities can be observed in terms of the importance attached to the attraction of professors and postdocs. Students are not targeted by specific policy instruments. Policy-makers in Vienna and Munich regard their policies on soft location factors such as amenities or housing as being sufficient to position their cities in the international competition for international students. Hence, despite a broad discourse and hype in policy circles and popular media, competing for international students is of rather minor importance for urban policy-makers – at least until now in Vienna and Munich.

The analysis of the performance of Vienna and Munich in the competition for human capital shows that both cities benefit from net inflows of international human capital. The share of foreigners is somewhat higher in Munich, but progress towards internationalisation was much faster in the case of Vienna. Viennese universities exhibit higher and strongly rising shares of international academic talent, but no associated acceleration in diversity. The latter may be interpreted as a lower competitiveness of the city of Vienna in the competition for academic talent compared to Munich. Strongly increasing inflows of German students since 2005 have been increasing internationalisation, but this has been reducing diversity simultaneously. This process is by and large driven by regulatory arbitrage which enables German students to benefit from free access to Austrian universities. As a result, the increased internationalisation of Viennese universities must be interpreted cautiously and not as uncontested proof of the increased attractiveness of Vienna for academic talent.

Notably, none of the factors shaping the general structure of the flows of academic talent can be influenced by policy-makers in Munich and Vienna respectively. The general structure and size of student flows are determined by EU law and national university policies. If there is any measurable impact of urban BCP, it may be small and difficult to disentangle from other policies. However, it may be revealing to ask the counterfactual question: what performance would Vienna or Munich have displayed in the absence of the explicit and implicit BCP

implemented. At least for Vienna, one can speculate that soft location factor policies are important because the mediocre performance and resource endowment of the Viennese universities could not substitute for missing urban attractiveness via research or teaching excellence.

It remains to be seen whether BCP will gain in importance in the future as human capital becomes an increasingly scarce resource. There is still ample room for the development of smart policy instruments and improvement of existing policies. For instance, neither city actively engages in promoting brain circulation and supporting international graduates from urban universities in their local labour market search process. National policies grant a time span for job search for non-EU internationals which could be complemented by urban policies in order to profit from the positive spillovers associated with an international highly skilled workforce. Stay rates may also be increased due to internships of international students in local firms organised and coordinated by urban government. Successful policies for raising the level of tolerance and openness of an urban society, which are important for cities such as Vienna, require substantial resources and creative public initiatives with uncertain outcomes in the future. However, populism and resentment against foreigners is on the rise in times of increasing unemployment under the current financial and economic crisis. A further challenge is provided by the development of comprehensive evaluation methods for BCP. Policy learning via comparative policy analysis will play an important part in the continuing development of attraction policies for academic talent as well.

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