

Edinburgh Economic Analysis and Benchmark Report

**Special report on behalf of
Scottish Enterprise Edinburgh**



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Full Report

Basel, July 2006

Imprint

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Executive Summary

This paper summarises the key findings of the BAK Basel Economics Metro Edinburgh Economic Analysis and Benchmarking Report 2006. The report compares the performance of Metro Edinburgh¹ against a range of international and UK comparator regions. It describes the current economic context for Metro Edinburgh and goes on to benchmark the region against 19 other metro regions. The benchmarking includes overall economic performance, sectoral strengths and weaknesses as well as the attractiveness of the region as a business location. The report identifies the key challenges facing the region and suggests some strategic options for the future economic development of the metropolitan region.

Edinburgh Economic Context - Driver Sectors

In analysing the industrial structure of a region, BAK Basel Economics groups sectors into 5 aggregates - the so-called drivers of growth. Using this typology, the report provides an analysis of Metro Edinburgh over the 1980 to 2004 period.

The Drivers of Economic Growth:

BAK Basel Economics has developed a typology which aggregates detailed sectors data into 5 driver sectors with common properties. Amongst others, these properties include the level and growth of productivity. These are:

- | | |
|-------------------------------|---|
| (1) New Economy | - IT (hardware, software, services), telecommunication, microelectronics |
| (2) Old Economy | - chemicals, transport equipment, medical engineering |
| (3) Urban Sector | - business & financial services, hotels and restaurants, personal services, real estate, transport, trade |
| (4) Traditional Sector | - construction, production of goods not elsewhere included |
| (5) Political Sector | - public administration, healthcare, education, the primary sector, utilities. |

In 2004, Metro Edinburgh was significantly under-represented in the Urban Sector against the Average of Metropolitan Regions² and over-represented in the Political Sector (Figure 1). This was also the case in 1980.

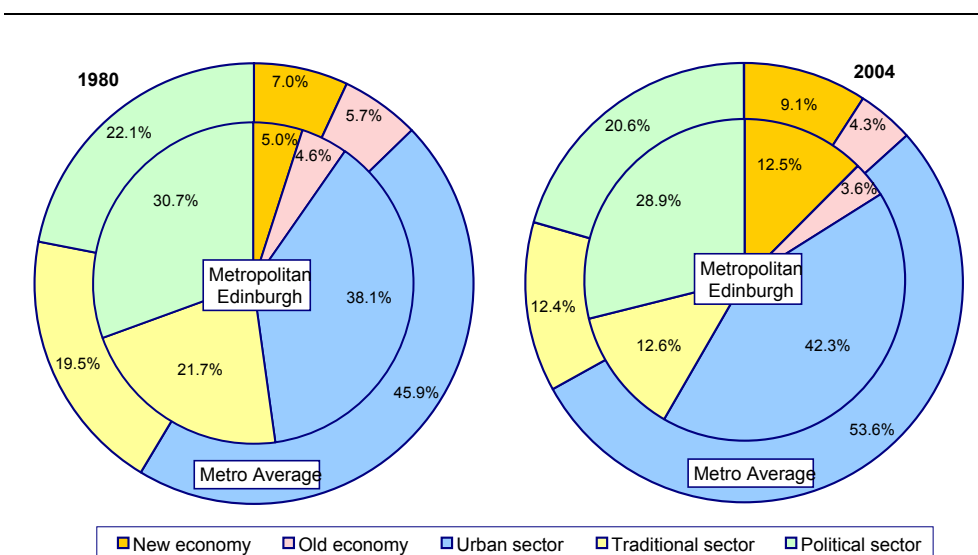
¹ Metro Edinburgh is defined following the concept of a functional urban region. A metropolitan region is defined as the area closely tied to the city in terms of commuting, commercial activities and use of retail and leisure facilities. Commuting patterns are usually the most important indicator used to define a metro region. Metro Edinburgh, according to the above stated definition, consists of Edinburgh City, Clackmannanshire and Fife, East Lothian and Midlothian, West Lothian, Scottish Borders and Falkirk.

² The average is calculated from 26 European and 2 US metropolitan regions with available data. It should be noted that it is not an average of the regions used in the benchmarking. The terms 'Metro Average', 'Average of Metropolitan Region', 'European Metro Average' and similar terms are used interchangeably and always refer to the same average.

These two sectors are the most important sectors in a metropolitan economy. Since 1980, the Urban Sector has increased its share of the economy. This trend is evident in Metro Edinburgh and across the Metro Average, but the increase in the Urban Sector was stronger in the Metro Average. Since 1980, the only other sector with an increasing share was the New Economy, with stronger growth in Metro Edinburgh than in the Metro Average. The Traditional Sector, the Political Sector and the Old Economy shares have declined in both Metro Edinburgh and across the Metropolitan Average. When comparing the two largest sectors in metropolitan economies, Metro Edinburgh is over-represented in a sector with a declining share (Political Sector) and under-represented in a sector gaining share (Urban Sector).

Fig. 1: Shares of Driver Sectors in the Economy

In percent, 1980 and 2004, current prices



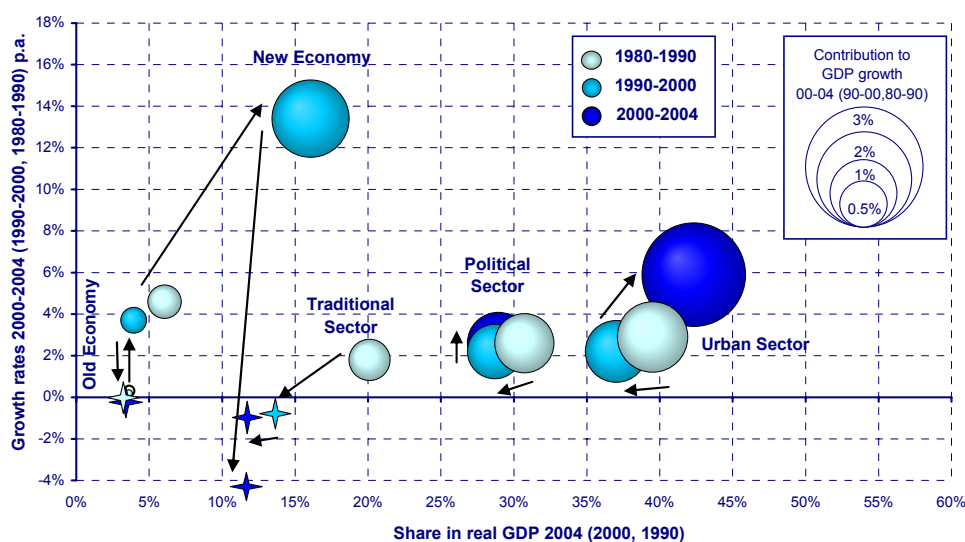
Source: BAK Basel Economics

The success of the New Economy has been a temporary phenomenon (Figure 2). The largest contribution to growth in Metro Edinburgh has come from the Urban Sector, particularly since 2000, whereas growth of the Urban Sector has slowed across the metro average since 2000. Much of the success of the Urban Sector since 2000 in Metro Edinburgh has been driven by the City of Edinburgh. The growth contribution of the Political Sector has been much smaller, although it has been larger in Metro Edinburgh compared with the Metro Average. This demonstrates the limited growth potential of the Political Sector. The Traditional Sector and the Old Economy have contributed very little to growth - a similar picture to the Metro Average.

In summary, Metro Edinburgh has a smaller Urban Sector than its comparators - a disadvantage given the key role this sector has had in driving growth in the majority of metropolitan regions. However, there are clear signs that Metro Edinburgh has been playing catch-up since 2000.

Fig. 2: Growth Contribution of Driver Sectors: Metropolitan Edinburgh

Based on real GDP 1980-2004, at USD, 1995 prices and 1997 PPP



Note: Interpretation of a growth contribution 'bubble' chart: The contribution of a sector to the growth of an economy depends on its weight within the total (share) and on its growth rates. A large contribution to economic growth can be due to a high share and moderate growth or a smaller share but more dynamic development. Charts like the one above do provide all this information. The x-axis holds information on the share of the region (in percent). For example, the Political Sector in Edinburgh made up close to 25 percent of the economy in 1990. The y-axis reflects the average annual growth (in percentage points). The Political Sector grew with more than 2 percent a year from 1980 to 1990. Together, this results in a contribution to Edinburgh's growth of roughly 0.5 percentage points annually, reflected by the size of the bubble in the graph. The growth contribution of a Driver Sector increases when moving from the lower left corner towards the right and/or upwards. Very small and negative contributions are marked with a star.

Source: BAK Basel Economics

Through the Benchmark Lens - Key Findings

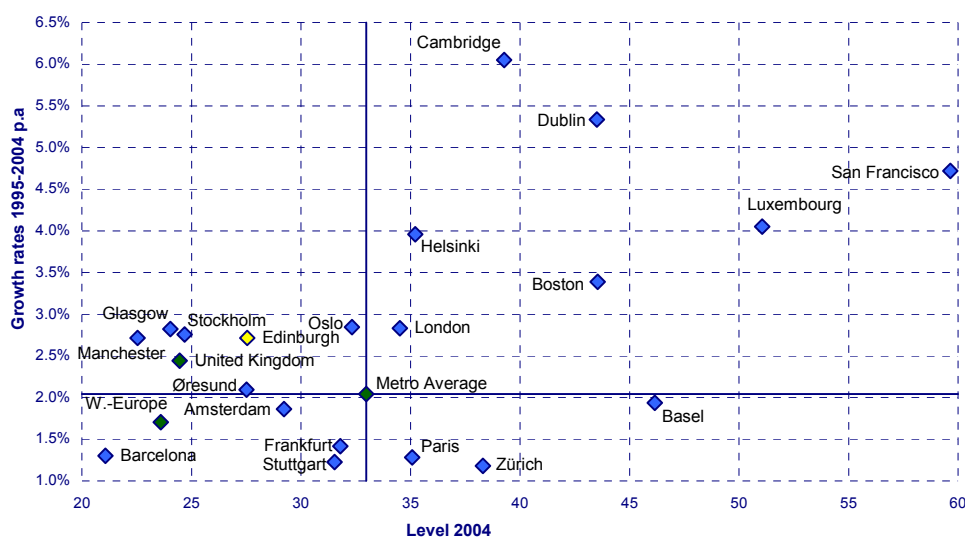
Metro Edinburgh has been benchmarked against 19 comparator metropolitan regions. They were selected to represent regions similar to Edinburgh - in size, industrial structure or economic situation. It is also an aspirational sample as it includes many 'best performers'. The key highlights of the benchmarking exercise are outlined below.

GDP per Capita

Compared with other metropolitan regions, the GDP per capita in Metro Edinburgh is low. In 2004, Edinburgh ranked 15th out of 20 metro regions (Figure 3). Compared to the broader Metro Average Metro, Edinburgh's GDP per capita is 15 percent lower - but it is catching up.

Fig. 3: Edinburgh and its Competitors: Real GDP per capita

2004 in USD, average annual growth 1995-2004 (based on USD at 1995 prices and 1997 PPP)



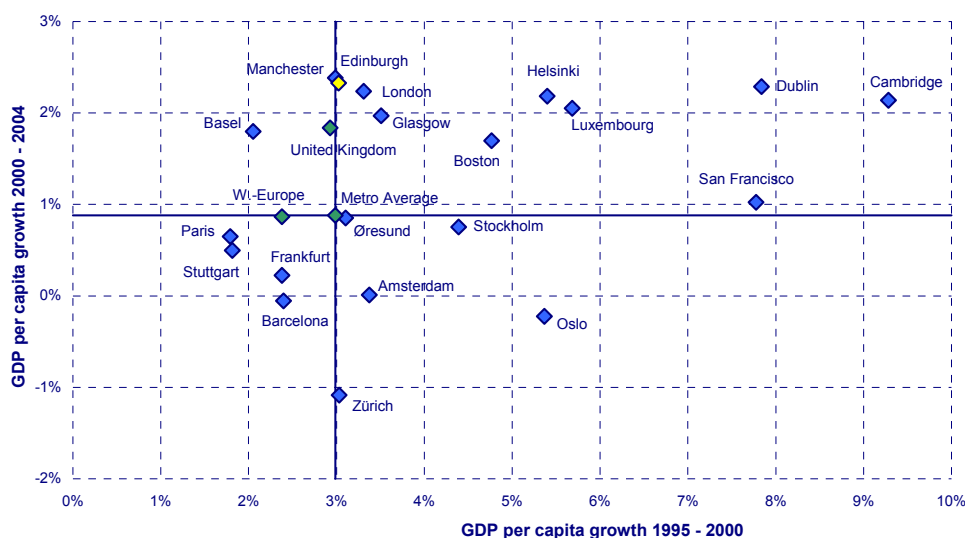
Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions.

Source: BAK Basel Economics

In 1980, the GDP per capita in Metro Edinburgh was only 75 percent of the Metro Average. More recently, in the period 1995 to 2004, GDP growth was 0.7 percentage point higher annually in Metro Edinburgh than the Metro Average. Within the ambitious benchmarking sample, Metro Edinburgh is positioned in the middle of the chart (Figure 3). Interestingly, Metro Edinburgh's performance has been improving in recent years. Between 1995 and 2000, economic growth in Metro Edinburgh was ranked 14th out of the 20 comparator regions, but between 2000 and 2004 it was ranked 2nd (Figure 4).

Fig. 3: Real GDP per Capita Growth 1995 to 2000 and 2000 to 2004

Based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions.

Source: BAK Basel Economics

Employment

Much of the recent success of Metro Edinburgh has been based upon employment growth. From 1995 to 2004 employment grew by 1.4% annually. Looking at job growth against population growth, the achievement was remarkable given that Metro Edinburgh has one of the smallest population growth rates in the sample. Metro Edinburgh shows one of the strongest increases in the employment per capita figure in the sample.

Productivity

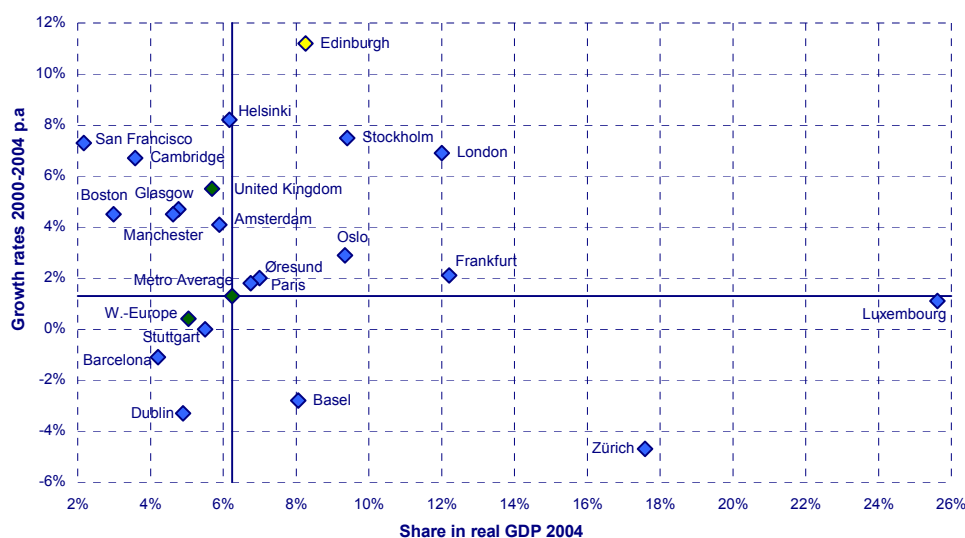
Between 1980 and 2004, Metro Edinburgh achieved above average productivity growth against the Metro Average. Despite this good performance, in 2004 the level of productivity in Metro Edinburgh was still significantly lower than the other metropolitan regions: Metro Edinburgh's productivity is currently less than 80 percent of the Metro Average's figure. In relation to the aspirational benchmark regions, most of the sample had higher growth rates over the last 10 years than Metro Edinburgh.

Driver Sectors

As discussed previously, one of the most important drivers of metropolitan economies, the Urban Sector, is under-represented in Metro Edinburgh. This is due largely to an under-representation in real estate and transportation compared to the Metro Average.

Fig. 4: Growth Contribution of Banking 2000 to 2004

Based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions.

Source: BAK Basel Economics

However, other sub-sectors have been performing well. Banking has made a significant contribution to recent economic growth. Figure 4 illustrates that between 2000 and 2004 the sector grew faster than in all the benchmarked regions, which include well-known and successful financial service locations like London, Zürich and Luxembourg.

The Political Sector is over-represented in Metro Edinburgh compared to the Benchmark regions. This is primarily due to the higher concentration of Education, Health and the Primary Sector in Metro Edinburgh compared to the Metro Average. Although this sector has grown more in Metro Edinburgh, it is questionable whether specialising in the Political Sector is an appropriate growth strategy for a metropolitan region. The Political Sector is not known to be especially productive and its growth potential seems limited.

Quality of Location

The benchmarking exercise also looked at a range of factors which describe the quality of Metro Edinburgh as a place for doing business. Key findings included:

- The Metro Edinburgh universities score very well in academic research, but are relatively small in scale due to the regions size. Collaboration with other neighbouring institutions could help to give this scale.
- In terms of human capital, Metro Edinburgh's performance has been improving and in 2004 was in the top half of the benchmarked regions with respect to tertiary education. Combining secondary and tertiary education to measure qualified labour, Metro Edinburgh is amongst the best performers.
- Research and Development expenditures are low, less than expected considering the local skills base and the excellent university research in the region.
- Metro Edinburgh is positioned on the edge of Europe and consequently has below average international accessibility. Still, the gap is not dramatic.
- Metro Edinburgh has an advantage over many competing metropolitan regions, ie its location within the UK. Edinburgh enjoys the liberal labour and product markets of the UK. Furthermore, tax levels are moderate for companies and individuals. These comparative advantages need to be capitalised upon.

Key Challenges

From this analysis, it is clear that Metro Edinburgh is facing some important challenges:

- Overall productivity levels, although clearly improving, should be the primary focus of economic policy. Productivity levels have a huge influence on the competitiveness of a region and the wellbeing of its inhabitants. To bring productivity up to the level of its international competitors is Edinburgh's number one challenge for the future.
- Metro Edinburgh possesses the resources for a successful knowledge-driven economy: High University quality and quantity; a high standard of human capital in the labour force; and is an attractive place. Metro Edinburgh should be getting more from these assets than it gets today. A key challenge for the future is to make more efficient use of these resources.
- Scale is an issue for Metro Edinburgh. Due to its size, Metro Edinburgh clearly competes in a second tier of metropolitan regions in Europe. In 2 key business

areas, financial services and tourism, size plays an important role. Closer collaboration with surrounding regions, especially Glasgow, would add to the weight of these key sectors on a European or even world-wide scale. For Financial Services in particular, it is important to use the close inter-relationship between the City of Edinburgh and the City of London. This is an asset to build on given London's status as a global financial centre.

Options for the Future

Sectoral Mix

Many metropolitan regions in highly developed economies show a specific industrial emphasis. They can be characterised as high tech regions, business focused metropolis, or consumer/leisure cities. For many metropolitan regions, it is advisable to concentrate on one area they are especially strong in. For Metro Edinburgh, the conclusion is different: Its specific strengths allows for a more mixed strategy.

The Financial Sector, one of the most important components of a business city, is already strong and growing fast. The success of tourism shows that Metro Edinburgh also has strengths as a leisure or consumer city. Add to this the high level of human capital and the quality of research from its major institutions - there is also a sound basis for high tech industries. Whilst many of the hardware producing parts of the new economy are probably gone for good in Metro Edinburgh, Life Sciences offers particular opportunities. Edinburgh has world leading niches like Stem Cells research which look set to become much more important over time. The benchmarking exercise shows considerable potential for Life Sciences in Metro Edinburgh, but there needs to be further investigation to build an evidence base for strategic decisions. Some caution is also necessary as the size of the High Tech sector is comparatively small in Metro Edinburgh. Even if highly successful, it is therefore unlikely to be a major driver of Metro Edinburgh's growth for quite some time to come, as it needs time to built up weight in Metro Edinburgh's economy. In addition, the High Tech sector as a whole has been vulnerable to structural shifts over the period covered by this report - with electronics in particular taking a major hit in the late 1990s. Concentrating on high value activities, ie research and development and supporting close networks between companies and research institutions, should ensure a more sustainable growth.

A key advantage for Metro Edinburgh is that the requirements for these sectors in terms of attractiveness of place and quality of life and high skill levels are mutually

reinforcing. Continued investment in place attractiveness of Metro Edinburgh should ultimately make an important contribution to the growth of the key sectors.

Metro Edinburgh needs a mixed strategy focused on its key strengths.

Building Capacity for Greater Innovation

Innovation is undoubtedly a key issue for any developed economy to stay competitive in a globalised world. An innovation fostering environment has to be at the top of the economic policy agenda. An attractive, open and tolerant environment for incoming labour, especially highly educated labour, from the UK or from abroad can help local development tremendously.

A further important issue relating to innovation is the more effective use of the available knowledge resources. Strengthening the links between business and research institutes should help direct resources to the most innovative activities. Support for networking and setting incentives to innovate are measures regional agencies should utilise. Such a policy should comprise businesses, private and public research institutions, individual researchers and the higher education institutions. Other relevant policy areas include regulation and taxation, where incentives to innovate should be promoted.

The critical challenge is to build the capacity to drive productivity growth in the future. Growth will be limited unless this is done.

City Collaboration

A common issue for the sectors mentioned above is scale. For different reasons, all of these sectors can profit from increasing their scale and critical mass. There are a number of key areas where collaboration with Glasgow in particular could bring major benefits:

- Co-operation, co-ordination and networking between the Higher Education Institutes and other research facilities could bring economies of scale and scope in knowledge creation and increase the economic impact of research.
- Co-ordinated marketing and shared large events could increase visibility for international tourism. Such collaboration could increase market share for Scotland as a whole.
- For business services, the issues are around creating a larger labour market through improved accessibility as well as the potential for a division of functions.

- The central issue of attractiveness as a place to live and work can also be supported by greater collaboration: by increasing the variety of environments offered, the housing opportunities and growing the available labour market.

Although competition between the two cities will and should continue where appropriate, Glasgow offers more opportunities than threats to Metro Edinburgh. Collaborative effort could generate the visibility and critical mass needed to withstand international competition and achieve greater success globally.

Flexible Labour and Product Markets

Metro Edinburgh, as part of the UK, enjoys a liberal economic setting. The favourable regulatory and taxation environment supports innovation. This facilitates relatively quick and easy adaptation within the economy to new demands. Metro Edinburgh should be aware of these advantages, value them highly, and include them in any strategic assessment. At the same time, does the UK trend of devolving power and responsibility provide more leeway at regional level? If so, Metro Edinburgh could and should use these newly acquired freedoms.

CONCLUSIONS

Metro Edinburgh benefits to some extent from UK advantages. This favourable position is not guaranteed for the future, eg as labour and product markets become more flexible elsewhere. It should be the goal to foster specific regional success in addition to using these UK advantages. A strong innovation push is required - the basic resources are available, but they have yet to be put to the most productive use.

Whilst the GDP as well as the productivity gap between Metro Edinburgh and its benchmark regions is stark, the most recent evidence shows that gap is reducing. The challenge now is not just to keep up with competitors in the future but, by delivering a step change, pursue a leading position. If this does not happen, there is danger of Metro Edinburgh losing ground particularly if some of its key location advantages diminish. Metro Edinburgh needs an ambitious goal - to become one of the leading city regions in Europe.

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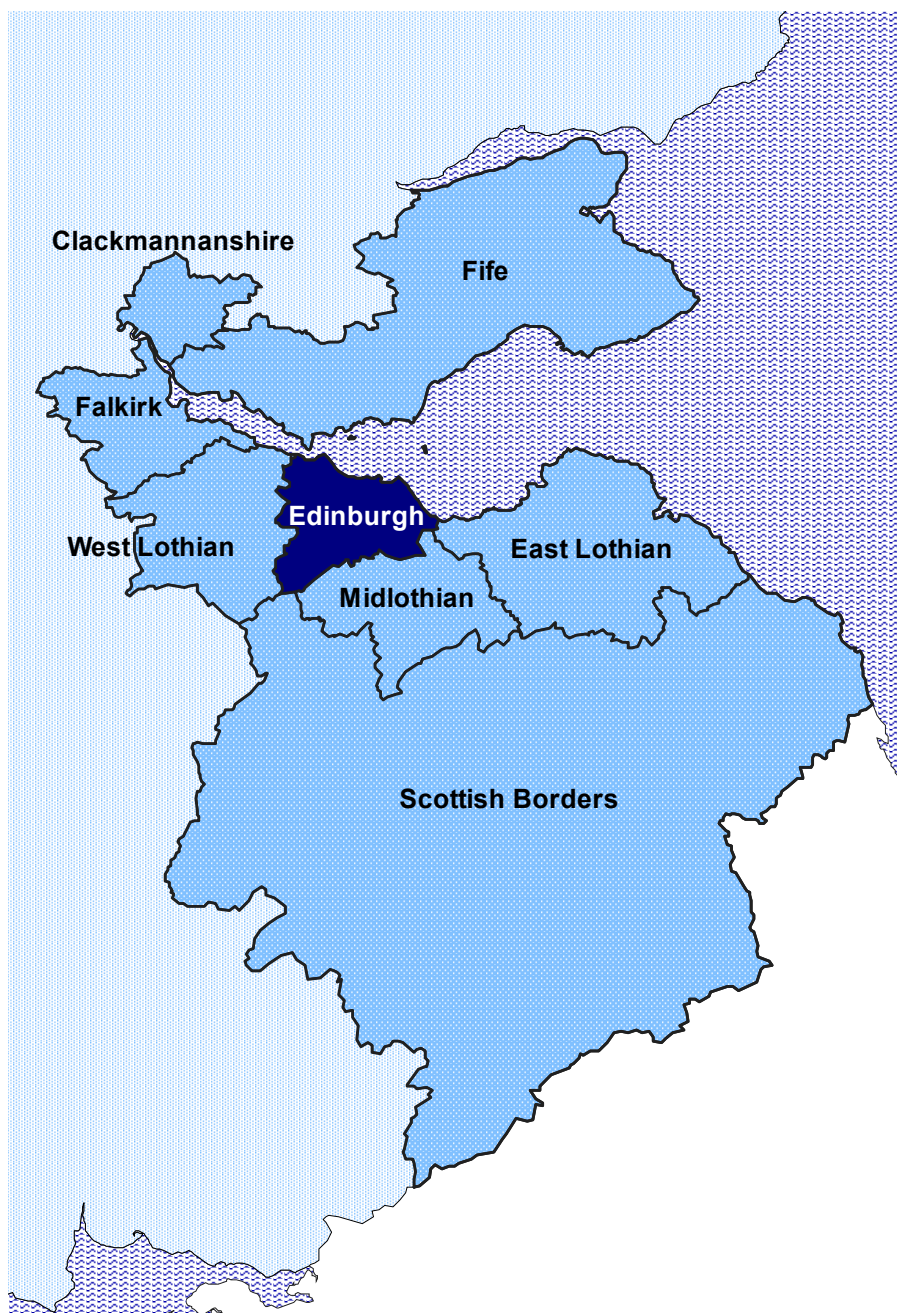
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City of Edinburgh and Metro Edinburgh

The metropolitan region is defined as the area closely tied to the city in terms of commuting, commercial activities and use of retail and leisure facilities. With this approach, Metro Edinburgh consists of Edinburgh City, Clackmannanshire and Fife, East Lothian and Midlothian, West Lothian, Scottish Borders and Falkirk.

1 Introduction

Fostering favourable conditions that support economic growth, create employment opportunities and raise income levels is one of the core goals of government. The electorate measures the success of economic policy makers mainly against these objectives. Although traditionally these issues have been addressed at a national level, the distinction between national issues and regional issues is no longer so clear cut. On the one hand, economic performance is increasingly driven by global developments – in world trade or oil prices, for example – and by supranational bodies like the EU. On the other hand, regions and regional decision makers also play increasingly important roles.

Over the past 10 to 15 years, many regions, particularly in Europe, have gained more leeway to shape their fiscal and regulatory settings and to influence other location factors important for regional economic development. Decentralisation ratios clearly indicate this shift towards more regional power and responsibility³.

At the same time, globalisation exposes regions to much more competition among each other. Trade statistics reveal both the growing openness and the vulnerability of regions towards the outside world. Increasingly, it is the combination of regional location factors which drive the economic success or failure of a region, and many of these factors are driven by regional decisions. Regional factors and regional policy – or policies at the regional level – are becoming crucial elements of regional, and consequently, of national growth strategies.

Although far from complete, there is plenty of knowledge and advice for growth supporting policies on the national level. At a regional level, such advice is more scarce. This is where regional benchmarking can help to analyse and shape development at the regional level. Since 1998 BAK Basel Economics has established exclusive databases and, based on this, a Regional Benchmarking Programme with the aim to help regions and regional decision makers cope with the challenges of globalisation and decentralisation. Its goals are to advise governments, administrations, trade associations, NGOs and companies at the national and regional level on matters of location quality and economic policy.

The core tool used by BAK Basel Economics to support regions in making these decisions is international benchmarking. In order to be able to do International Benchmarking at regional level an extensive – and in this context unique – database is required. This database allows the comparison of economic performance and the quality of location factors among a set of competing and

³ Decentralisation Ratios measure the share of political power of – or the share of political decisions made at – the regional level instead of the national or supra-national level.

comparable regions across Europe and the United States. The IBC database relies on official national and international statistics, but often this data is not detailed enough and sometimes lacks international comparability. Further sources like employment or industry statistics are exploited to complete the database. If necessary, variables are redefined or adapted to guarantee international comparability and, in some cases, data on a regional level has to be estimated based on national data and other information⁴.

Functional Urban Regions and the definition of Metropolitan Regions

A Functional Urban Region is an area building a common economic unit. What exactly forms a common economic area is of course open to interpretation. More often than not, the labour market is used to define this area: The number of commuters from outside the area should be relatively small or, if two functional regions share a common border, they should have an equal number of commuters in both directions across their common border. Of course, even this definition leaves room for different solutions and results. The definition can be narrowed further by using the jurisdiction boundaries of administrative regions. Using administrative regions is also necessary for data reasons because data is normally only available for administrative regions. Still, the main source for the definition should always be the commuting pattern.

The metropolitan region is defined as the area closely tied to the city in terms of commuting, commercial activities and use of retail and leisure facilities. In other words, metropolitan regions are large functional urban regions. Often they have a core city, but the area functionally belonging to the metropolitan region is much larger than the (administrative) city and includes other cities, suburbs and even rural areas surrounding it.

To do international benchmarking for Metro Edinburgh requires us to define which areas build to the metropolitan region. Clearly, the City of Edinburgh is narrowly defined and does not form the complete metropolitan region⁵. To be informative, an international benchmarking should compare regions which built a common economic unit, also called a functional urban region (see box for further explanation of the concept). The metropolitan region is defined as the area closely tied to the city in terms of commuting, commercial activities and use of retail and leisure facilities.

Applying this concept, Metro Edinburgh encompasses Edinburgh City, Clackmannanshire and Fife, East Lothian and Midlothian, West Lothian, Scottish

⁴ The main sources for the IBC Database are the national and regional accounts furnished by the national statistics offices or Eurostat. For several regions, the sectoral disaggregation is not detailed enough. Available employment or industry statistics were used to estimate missing data. For hours worked, the basic source is OECD (national data). BAK estimates the industry details using national statistics. Data for recent years is estimated by applying the World-Model and the Industry-Model of BAK Basel Economics and Oxford Economic Forecasting. Location factor quality is measured by data from various sources and BAK's own calculations. Furthermore, BAK ensures the international comparability of the data, among other issues by applying purchasing power parities on industry level and redefining national statistic definitions if necessary. For more information, please see the Appendix or BAK (2005).

⁵ The same concept is also known as a 'city-region'.

Borders and Falkirk. Of course, these sub-regions within Metro Edinburgh have very different characteristics. The City of Edinburgh constitutes the core city of the metro region, with the Lothians tightly bound to it. Typical core services are provided here, like financial services or retail trade. It is also the knowledge centre, with a high concentration of research institution and closely linked industries like Life Sciences and electronics. A substantial flow of commuters to this core city area is observed from the remaining part of the region.

BAK Basel Economics has been asked by Scottish Enterprise Edinburgh and Lothian (SEEL) to provide an international benchmarking analysis for Metropolitan Edinburgh. This report summarises the results of this benchmarking exercise. It is structured in four main parts.

Chapter 2 provides an overview of the economic conditions and recent history of Metropolitan Edinburgh. It covers Metro Edinburgh's situation in 2004 as well as its development from 1980 to 2004. The analysis presents Metro Edinburgh's economy in the context of the UK and the Western European economies as well as against the background of a Metro Average. It also looks at the performance of the City of Edinburgh and touches upon the issue of Core City versus Metropolitan Regions. The differences in the economic structure between both regional concepts are discussed.

The main international benchmarking analysis is set out in Chapter 3. The situation and development of the economy of Metro Edinburgh is compared to 19 metropolitan regions in Europe and two city regions in the United States. The chapter focuses on the economic performance and the structure of the economy and highlights in particular the more recent 1995 to 2004 period.

Chapter 4 benchmarks the quality and quantity of important location factors in Metro Edinburgh against the same metropolitan regions as above. The policy areas of central interest are innovation, taxation, regulation and accessibility. This helps to understand differences observed in the benchmarking of economic performance and to build a sounder base for future policy decisions

Chapter 5 provides a more detailed analysis of the performance of key sectors for Metropolitan Edinburgh. It has not been possible to do an in-depth benchmarking analysis of individual key sector as part of this study. Such an analysis is beyond the scope of this report and would require data on more specific indicators not yet available for Metro Edinburgh. However important insights into the prospects of the Financial Sector, the Life Science Industry and Tourism are gained.

Finally, in Chapter 6 the findings are summarised and synthesised and a number of strategic policy options derived.

2 Edinburgh: Economic Setting

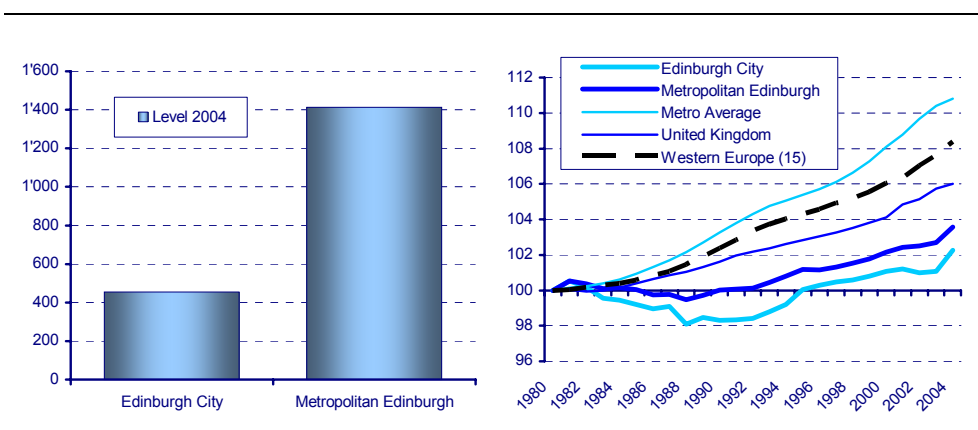
The first section of this report describes Edinburgh's current economic situation (2004) and its economic path over the past 25 years (1980-2004). This will help to understand the current situation and prospects for Edinburgh. We will then take a closer look at Metropolitan Edinburgh's data and compare them locally (with Edinburgh City), domestically (with the UK average) and internationally (with the Western European Average and a Metropolitan Regions Averages⁶). A thorough understanding of Metro Edinburgh's starting position is essential to help understand more recent developments and for designing effective future economic strategies.

2.1 Economic Performance

In 2004, Edinburgh City had approximately 450'000 inhabitants. The metropolitan region was about three times as large (1.4 million). This wider region extends far outside the administrative city borders. It is clear from the analysis that Edinburgh City and Metropolitan Edinburgh, when defined as the functional urban region belonging to Edinburgh, are far from being equal. We are talking about two different entities.

Fig. 5: Population

Level 2004 (in 1,000 persons) and evolution 1980-2004 (Index 1980 = 100)



Source: BAK Basel Economics

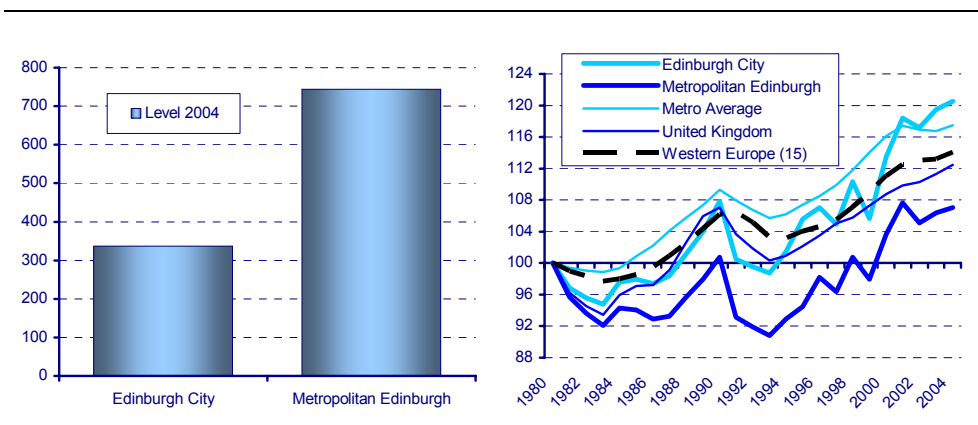
⁶ See Annex for details on the averages. 'Metro Average', 'Average Metropolitan Region', 'European Metro Average' and similar terms are used interchangeably and do always refer to the same group of regions. See Appendix for a list of regions included in this group.

In 2004, the population of Edinburgh was only slightly larger than in 1980. This was true for the City as well as for the Metropolitan region, although the latter did somewhat better. Each has shown very low population growth compared to the UK in general, Western Europe or other metropolitan regions. During the eighties, Edinburgh City experienced a declining population while in the Metropolitan region, the population in 1990 was just about equal to the level in 1980. In a decade in which Western Europe and the UK enjoyed population growth, Edinburgh was going in the opposite direction. The ability to attract population is a key measure of success for regions. From this perspective therefore Edinburgh was not successful in the eighties particularly as this poor performance was not the result of a general decline of cities and metropolitan regions. On the contrary, the Metropolitan Average showed significant population growth throughout the period under observation (1980 to 2004).

During the nineties, Edinburgh kept up more successfully with other areas, although it still lagged far behind the Metropolitan Average. Since 2000, whilst there has been growth in Edinburgh, other areas have grown faster resulting in a widening of the gap. This holds for the City as well as the Metro region of Edinburgh. Overall, population growth in Edinburgh has been substantially slower than in other European regions, especially in other metropolitan areas. Although not as severe as it was, the gap has remained in recent years. This is particularly interesting given that in a Scottish context Edinburgh's population growth has been a relative success story.

Fig. 6: Employment

Level 2004 (in 1,000 persons) and evolution 1980-2004 (Index 1980 = 100)



Note: Employment covers all persons, both employees and self-employed, working at least 1 hour per week.

Source: BAK Basel Economics

In 2004, nearly half of the employment within Metropolitan Edinburgh was located in the City (336'000 out of 744'000). Having a share of employment in the city that

is significantly higher than the share of the population is typical for a metropolitan region. People prefer living in the suburbs and commuting to the city for work. This pattern makes clear why comparing economic indicators for cities with the corresponding indicators for metro regions paints a biased picture, especially if the indicators are measured per capita. A comparison of economic indicators should only be made if the units they refer to do have similar functions, e.g. are functional urban areas or business centres. Otherwise, the comparison could lead to the wrong conclusions.

In the last 25 years, Edinburgh – City and Metro alike – has experienced two periods of substantial decline in jobs firstly in the early eighties and then early in the nineties. Compared to the averages for other areas, Metro Edinburgh's job performance was not very good between 1980 and 1994. However since 1994, employment has generally been on the rise. Some years saw minor dips, but even after the burst of the New Economy bubble early in the new millennium, there has been no substantial decline. Metropolitan Edinburgh has caught up quite substantially with an average annual growth between 1994 and 2004 of 1.4 percent (UK average 1.1%, Metro Average 1.0%). Over the same period Edinburgh City has grown by 1.7 percent annually. However this is not comparable to the other averages for the reasons discussed above.

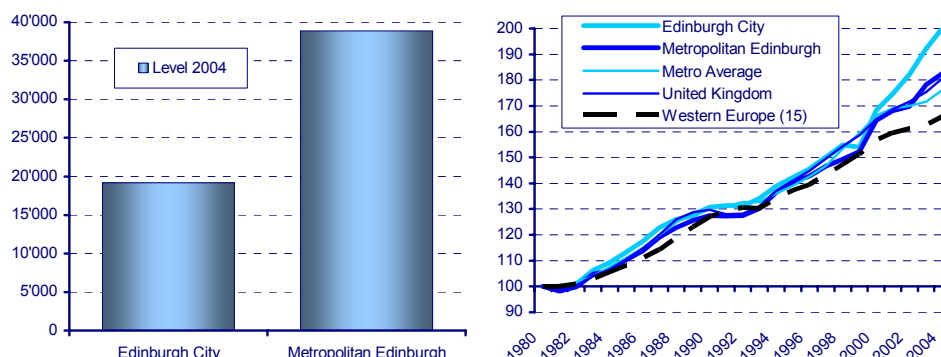
The relatively weak employment figures between 1980 and 1994 are less dramatic when seen in the context of a decreasing population. With a falling population it is not surprising that fewer jobs were created respective to the number of jobs lost. Of course, here the question of causality quickly arises: does a loss in population cause a loss in jobs? Or does the population decline because of fewer job opportunities? In summing up the findings, overall, the ability of the Edinburgh economy to provide jobs during the last 25 years was impressive both in terms of absolute numbers and compared to other metropolitan regions, the UK and the Western European average.

The impact of the city on the surrounding area is even more pronounced when analysing the GDP of Edinburgh. The city accounts for 19.1 billion, or 49.3 percent, of Metropolitan Edinburgh's 2004 GDP of 38.9 billion US\$. As a consequence of this productivity was higher in the City than in the metropolitan region. This is a common pattern in the relationship between a core city and its metro region: The city profits from the higher density through economies of scale and scope and spill-over effects⁷.

⁷ The reasons for such a pattern are discussed in the New Economic Geography, starting with Krugman (1991). See Eichler, Blöchliger, Grass and Ott (2006) for a summary of arguments and empirical findings.

Fig. 7: Real GDP

Level 2004 (in millions USD) and evolution 1980-2004 (Index 1980 = 100)
(based on USD at 1995 prices and 1997 PPP)

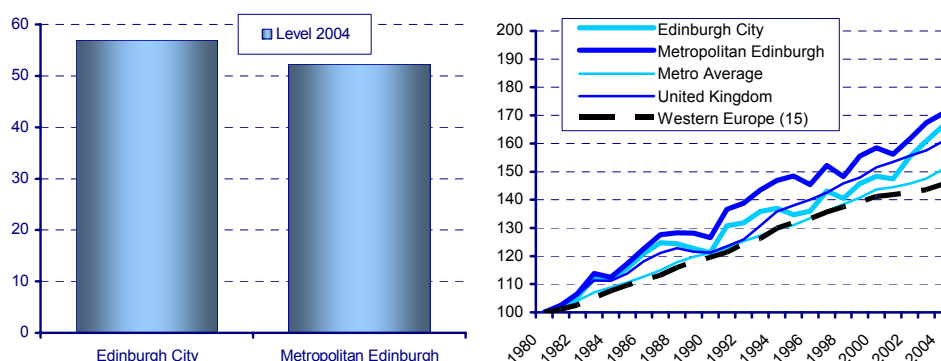


Source: BAK Basel Economics

Edinburgh saw a constant increase of GDP with the exception of a period of stagnation around the year 1990. The real GDP produced in the City doubled from 1980 to 2004. For Metro Edinburgh, the increase amounted to roughly 80 percent. Interestingly, the growth of GDP in the City and the Metropolitan region developed almost in parallel until the year 2000. Only since 2000 the City has grown substantially faster.

Fig. 8: Productivity

Real GDP per person in employment: level 2004 (in USD) and evolution 1980-2004 (Index 1980 = 100)
(based on USD at 1995 prices and 1997 PPP)



Source: BAK Basel Economics

Metro Edinburgh's recent GDP growth is strong when compared to the Metro Average, the UK and Western Europe generally. This achievement is even more impressive when recalling Edinburgh's below average performance in jobs and population growth. A consequence of this happy constellation is impressive

productivity growth in Edinburgh. It is clearly above average when compared to Metropolitan Regions, Western European as well as the UK. In fact the whole Metropolitan Edinburgh did especially well regarding productivity apart from in the last few years. Since 2000 the City has developed more dynamically than the Metropolitan region. Combining those two periods with different patterns, the average productivity increases for the complete period 1980 to 2004 for the City and for Metro Edinburgh are about equal. But on average over the complete period, both regions have stronger productivity gains than the average of Western Europe, the UK and the Metropolitan Average.

Productivity:

Two measures of productivity are usually used in economic analyses: hourly productivity and employment productivity. Hourly productivity is defined as output per hour of labour input in the economy. Employment productivity is the output per employee (including the self-employed). Output is measured as GDP or value added.

Although basically providing the same information, the measures can differ from one another. Reasons for differences are especially found in the usual hours worked and the part time employment structures. Other issues like overtime, holidays, average sick leave duration and similar issues influence the results as well. The differences can be observed in the levels as well as in the dynamics of the indicators.

Neither of the indicators can be regarded as the superior one. Depending on the question asked, one can be more suited to the analysis than the other. For many economic questions analysing differences in the economic development, hourly productivity is regarded as more precise because it is not influenced by labour market issues like part time structures. However, data availability is often better for employment productivity. Furthermore, employment productivity does more directly fit into one analysis with figures like GDP per capita or the number of jobs.

Here, the analysis focuses on employment productivity.

There has also been quite a strong GDP per capita increase in Metro Edinburgh. Since 1980, GDP per capita in Metropolitan Edinburgh has increased by about 80 percent. This is equivalent to an annual increase of 2.4 percent, a very substantial increase in real output per capita. It easily surpassed the 1.8 percent in Western Europe and the 2.0 percent in the Metropolitan Average. With an annual growth of 2.2 percent, the UK had slower advances in real GDP per capita as well. The same findings hold in general for the City of Edinburgh, although the pattern of growth over time is somewhat different from Metro Edinburgh.

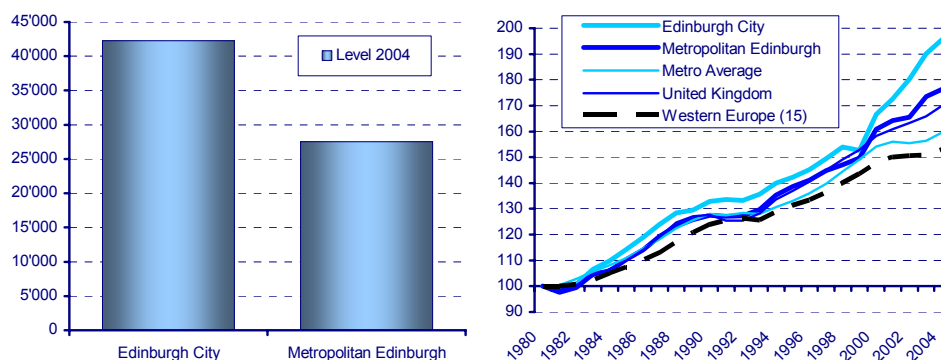
For the City, the GDP per capita figure is biased by commuting patterns. Therefore, the high level displayed is not surprising – it is biased by the net inflow of commuters. For comparisons with other regions, Metropolitan Edinburgh should be used. Metro Edinburgh reached a GDP per capita of US\$ 27'500 in 2004⁸. This is below the Metropolitan Average level of 33'000 US\$, but well above the Western European average level of 23'600 US\$ and the UK average of 24'500 US\$. Even

⁸ Notice that this is based on real GDP figures in 1995 prices. GDP per capita in 2004 prices – nominal GDP – is higher of course.

though Metro Edinburgh did very well over the last 25 years in GDP per capita, there remains quite a gap between it and other metropolitan regions. This issue will be picked up again in more detail in the benchmarking section below.

Fig. 9: GDP per capita

Level 2004 (in USD) and evolution 1980-2004 (Index 1980 = 100)
(based on USD at 1995 prices and 1997 PPP)



Source: BAK Basel Economics

This section provided long term development perspective of Edinburgh since 1980, distinguishing between the City and the Metro region if necessary. In general, Edinburgh was quite successful with respect to economic development. GDP per capita and productivity rose substantially, and most of the time, more robustly than in Western Europe, the UK and the Metropolitan Average. The total number of jobs increased somewhat less, especially in the metropolitan region. But combining the job growth with the population's development – the population declined or grew slowly – reveals a different picture: The employment to population ratio increased, which is what people in the region really care about.

As is typical for the relationship between a city and its metropolitan region, the City of Edinburgh is more productive and has more jobs per capita than the metro region. People live in the outskirts and commute to the city for work. Further, the city profits from the higher density with economies of scale and scope, network effects and spill-over effects. Indeed, with these advantages, a larger gap between the city and the metro region would have been expected than is actually observed. Furthermore, for most of the time, GDP in the city and GDP in the metro region develop along similar growth paths. But the data suggests that beginning around the year 2000, there was a step change in the city. Since that time, GDP growth as well as productivity growth in the City of Edinburgh has clearly outperformed Metropolitan Edinburgh. It seems that, with some delay compared to other metropolitan regions, Edinburgh City is now really taking advantage of its density.

2.2 Industrial Structure

The economy can be very heterogeneous in structure and development. One way to control for this in benchmarking analysis is to analyse the industrial structure of the economy and its contributions to overall economic development. Of course, there are limits to such an analysis. Dividing the economy into excessively detailed industries would probably mask more than it reveals⁹. For the following analysis, the economy is, grouped in two ways: according to sectors – primary (mainly agriculture), secondary (producing industries) and tertiary (services) – and into five aggregates with common properties – the so-called drivers (for details see box).

The Drivers of Economic Growth:

In analysing an economy, it often provides helpful insights to analyse specific industries or sectors separately. But dividing the economy into too many different industries can also be confusing and might hide the actual structures of interest under a bulk of information (currently, the international benchmarking database from BAK Basel Economics regularly provides data for 46 different industries, in some cases even more detailed). Therefore, BAK applies a concept to collect the individual industries into 'sector aggregates' with common properties (Sources of growth or influence like demand from certain markets, technology or political influences, close connections between the industries ...).

One common property of the industries in a sector is productivity. The industries within an aggregate are more or less in the same situation regarding productivity, especially the productivity level.

These 5 aggregates – called the five 'drivers' – are:

(1) **New Economy:**

The industries in the New Economy Sector are characterised by very dynamic development and are closely related to the area of communication, information processing and the internet. They are technology as well as demand driven.

Productivity level and productivity growth are clearly above average.

It basically subsumes the IT (hardware, software, services); telecommunication; microelectronics.

(2) **Old Economy:**

The Old Economy Sector subsumes producing industries with very high levels of value added as well as usually high levels of productivity. Either the product itself or the production process, or both, involve High-Technology.

Productivity level and productivity growth are above average.

The Old Economy Sector comprises, in particular, industries such as the chemical-pharmaceutical industry, transport equipment, medical engineering, and the production of precision instruments.

(3) **Urban Sector:**

The Urban Sector includes all the services for persons and companies which are typically concentrated in an urban setting. Within a geographical unit, they are most concentrated in the centre (e.g. for France in Paris, for a metro area in the city centre, within a rural setting in the village centre).

Productivity level is around the average, productivity growth is diverse but mostly above average.

The Urban Sector consists of services that meet needs of individuals and companies such as commerce, hotels and restaurants, personal services, real estate, transport, financial and corporate services.

⁹ The benchmarking database from BAK Basel Economics would currently allow the separation in up to 46 different industries for all regions. In selected regions, even more detailed industry information is available.

(4) Traditional Sector:

The Traditional Sector aggregates the remaining producing industries. Typically, these industries have a lower value added level and lower productivity. Labour costs are more important in their cost structure than in the other producing industries, and technology plays a smaller role. In industrialised economies often they are either very specialised in a niche or they face strong competition from the developing world.

Productivity level and productivity growth are below average.

The Traditional Sector includes especially production of consumption and intermediate goods as well as construction.

(5) Political Sector:

The Political Sector summarises all industries which are potentially strongly influenced by politics. That does not necessarily mean that politics directly determines this industry in all regions, but it is a political question how much the industry is based on private rather than public decisions. The answers to these questions can differ between regions and times.

Productivity level is below average, productivity growth is somewhat awry.

The Political Sector covers basically public administration, healthcare, education, the primary sector and utilities.

The Appendix provides a complete list of industries and which Driver Sector they belong to.

As is usual for highly developed economies, the tertiary sector is by far the largest of the three sectors in Edinburgh: About three quarters of the economy were within the tertiary sector in 2004. This is below what is usual in the Metropolitan Average (about 80%). Edinburgh's economy is a bit less service oriented than a typical metropolitan region's economy, but the difference is not dramatic. However since 1980 the share of the service sector increased by 15 percentage points from 60 percent in 1980 to 75 percent in 2004, at the same time decreasing the distance to the Metro Average from 8 percentage points to 5. Of the remaining quarter of Edinburgh's economy in 2004 nearly all of it is within the secondary sector (23%), down from 38 percent in 1980. The structural change from a secondary to a tertiary economy can be clearly seen from this data. That today three quarters of the economy are within one sector makes it even more crucial that we go beyond this analysis and look at key drivers of growth.

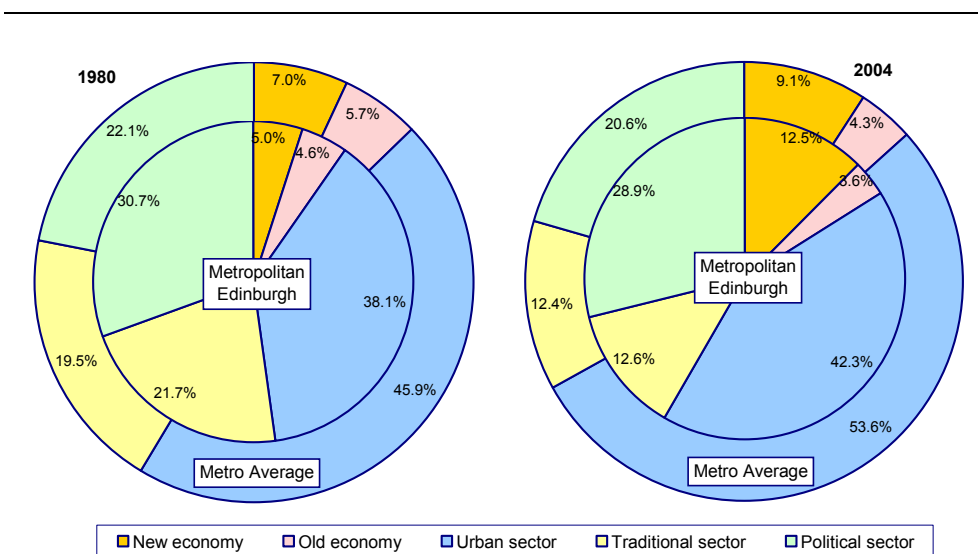
As is typical for metropolitan regions, the Urban Sector is the most important in Metro Edinburgh's economy. Whilst this was already the case in 1980, the weight increased further by 2004. However a comparison of Metro Edinburgh's structure with the Metro Average reveals that there is a gap in the share of the Urban Sector. The average share in other metropolitan regions is larger than Metro Edinburgh and that share increased by even more since 1980 when measured in percentage points. It would appear that Metro Edinburgh lags behind in developing the typical urban economy of a metropolitan region.

To a large extent, the Political Sector compensates for the lower Urban Sector share in Edinburgh. It is the second most important sector in Metro Edinburgh and the Metropolitan Average alike. Since 1980, it has lost a bit of its importance for

both Metro Edinburgh and the Metro average, yet it remains substantially more important in Metro Edinburgh. The function of Edinburgh as the capital of Scotland might be one of the reasons for the larger political sector compared to the Metro Average, but many of the regions building the Metropolitan Average also function as their region's political capital. Therefore, it can only be part of the story. Furthermore, because the largest share is not in the City as would be expected for the capital function, there must be further explanations. One is very clearly the delimitation of Metro Edinburgh. Metro Edinburgh encompasses a larger rural area than is usual for metro regions.

Fig. 10: Shares of Driver Sectors in the economy

In percent, 1980 and 2004, current prices



Source: BAK Basel Economics

This analysis is critical to Metro Edinburgh's future development opportunities. The Political Sector – like the Urban Sector – includes among other things a variety of services typically provide in metropolitan regions. However the prospects for each of these sectors are quite different. The Urban Sector includes many high value added and fast growing services. Within the Political Sector, the productivity level is mixed and growth potential is limited in large parts of it. Furthermore, 'exporting' services from the Political Sector is more difficult than from the Urban Sector yet a metropolitan region does need a strong export base. Summing up, the high share of the Political Sector – very probably at cost of shares of the Urban Sector – is an issue for Edinburgh to be considered critically in the further analysis.

Edinburgh's performance in the New Economy is impressive. Not only is a share of 12.5 percent in 2004 remarkable, but it is also higher than the Metropolitan Average and it has increased a great deal since 1980, substantially more than

observed in the Metro Average. Is the New Economy a success story for Edinburgh? And should a future economic strategy be based on it? These questions are picked up again later in the analysis.

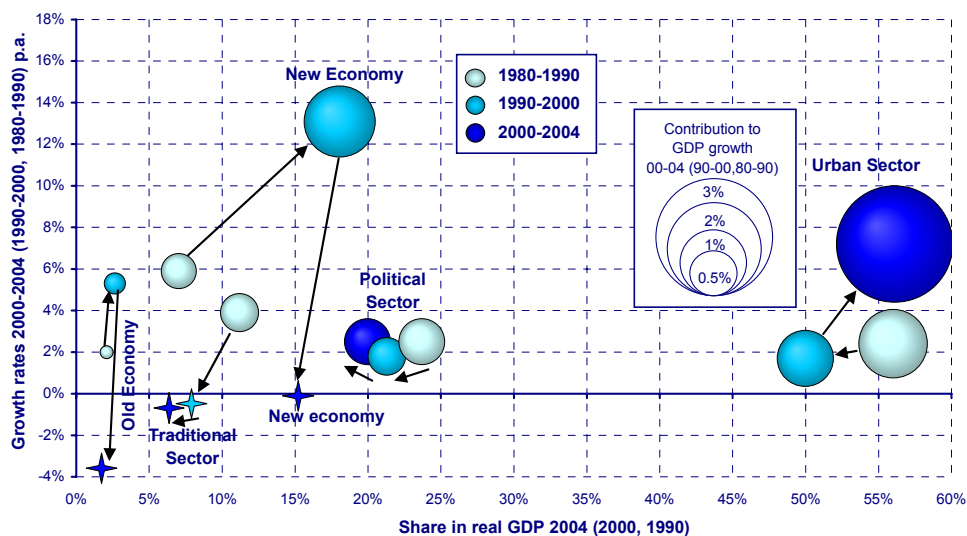
Finally, there are two more sectors: the Old Economy and the Traditional Sector. The Old Economy is rather small in Edinburgh and its share has decreased since 1980. Although the Old Economy' industries are high value adding and knowledge intensive and generally seen to have potential to boost high wage Western European economies, it is difficult to see them having a large impact on Metro Edinburgh's economic growth as its overall share of the economy is below 4 percent. Making up 13.6 percent of the economy, the traditional sector is more important than the Old Economy in Metro Edinburgh. However this is also a sector with poor prospects in high wage economies within a globalising world. It is therefore difficult to see either of these sectors as a key element in Metro Edinburgh's growth strategy. Of course, that does not mean that individual industries or firms within these sectors can not be successful and add valuably to Edinburgh's growth. However they are relatively small so it is difficult to see one of them as a driver of Metro Edinburgh's growth. A metropolitan region has to rely on strong contributions by larger sectors.

The total shares provide information on the importance of the different sections of the economy; the dynamics of change within and between the shares also tells something about structural change. The following section describes the development in more detail by analysing the growth contributions of the five driver sectors to the overall Edinburgh economy (see graphs below and box for an explanation). The graphs show the growth contributions of the five drivers to overall economic growth for the three periods 1980 to 1990, 1990 to 2000 and 2000 to 2004.

By far the largest contribution – most pronounced for the City, but also for Metropolitan Edinburgh – comes from the Urban Sector. It is not surprising that this is more pronounced in the City. Compared to the Metro Average, the performance of Edinburgh's Urban Sector from 2000 to 2004 is especially striking. While from 1980 to 2000 the growth contribution of the Urban Sector in the Metropolitan Average was higher than in Edinburgh due to faster growth and to a higher share in the economy, Edinburgh's Urban Sector surpassed the Metro Average growth between 2000 to 2004 by a large margin. The growth advantage was large enough to more than compensate for the smaller share and to achieve a growth contribution significantly larger than the Metro Average. In terms of the overall share of the urban sector Metro Edinburgh still lags the Metro average, but growth in Edinburgh after 2000 helped it catch up to the Metro Average.

Fig. 11: Growth contribution of Driver Sectors: Edinburgh City

based on real GDP 1980-2004, at USD, 1995 prices and 1997 PPP

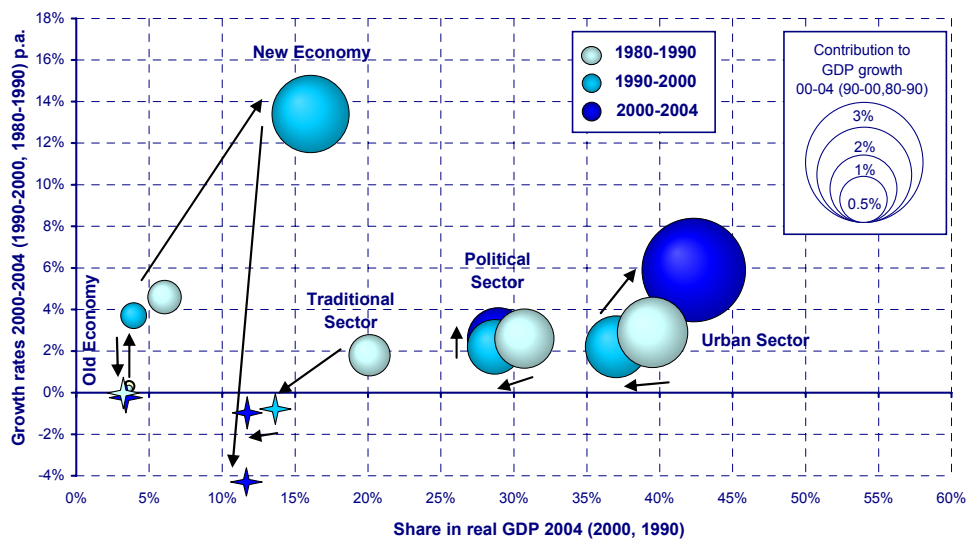


Note: Very small or negative growth contributions are marked with a star.

Source: BAK Basel Economics

Fig. 12: Growth contribution of Driver Sectors: Metropolitan Edinburgh

based on real GDP 1980-2004, at USD, 1995 prices and 1997 PPP

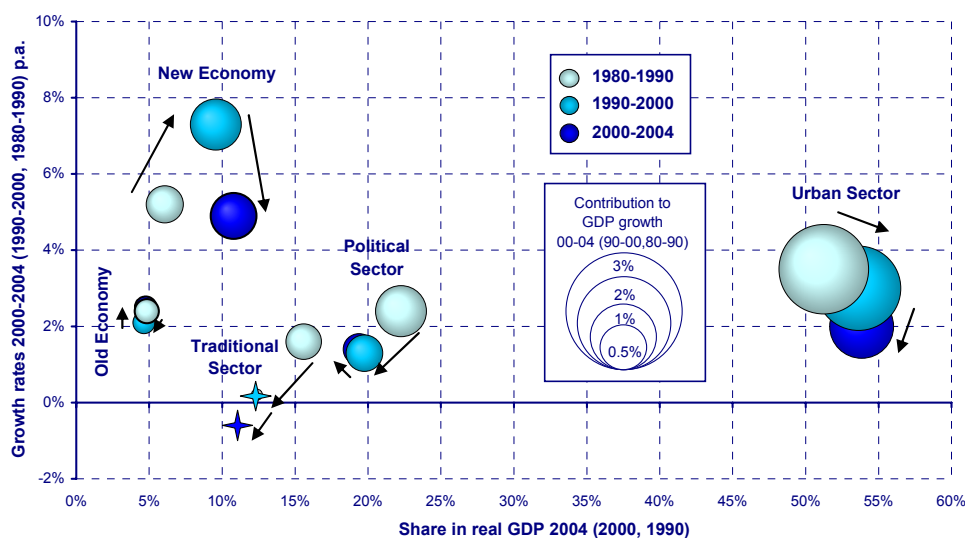


Note: Very small or negative growth contributions are marked with a star.

Source: BAK Basel Economics

Fig. 13: Growth contribution of Driver Sectors: Metropolitan Average

based on real GDP 1980-2004, at USD, 1995 prices and 1997 PPP



Note: Very small or negative growth contributions are marked with a star.

Source: BAK Basel Economics

Interpretation example for a growth contribution 'bubble' chart:

The contribution of a sector (industry, firm, region, etc.) to the growth of an economy (sector, region, country, etc.) depends on its weight within the total (share) and on its growth rates. A large contribution to economic growth can be due to a high share and moderate growth or a smaller share but more dynamic development.

Figures like the ones following do provide all this information. Here, they focus on the contribution of the Driver Sectors to GDP growth of a region. The x-axis holds information on the share (in percent). The y-axis reflects the average annual growth (in percentage points). Therefore, the growth contribution of a Driver Sector increases when moving from the lower left corner towards the right and/or upwards. As the relationship is nonlinear, the growth contribution is also given in the graph: the size of the bubbles reflects the growth contribution. Very small and negative contributions are marked with a star.

For example, consider the Political Sector in the City of Edinburgh. It made up close to 25 percent of the economy in 1990. From 1980 to 1990, it increased on average more than 2 percent a year. Combining these, the Political Sector contributed roughly 0.5 percentage points to the growth of the Edinburgh City's economy annually. Or in other words, had the Political Sector in Edinburgh just not existed, annual economic growth would have been $\frac{1}{2}$ of a percentage point lower. For 2000 and 2004, the share of the Political Sector was lower but it still grew. However, overall growth of the economy was stronger, which results in a declining share.

The low growth potential of the Political Sector, already mentioned above, is highlighted in this data. In the Metropolitan Average, the Political Sector was the second largest sector, yet its growth contributions were rather small and they deteriorated over time. In Metro Edinburgh, the Political Sector did somewhat

better, but the growth contributions were still not that large. Doubts remain about whether having a high share of the Political Sector is advantageous.

Interestingly, the share of the Political Sector is higher in Metro Edinburgh than in the City of Edinburgh itself. This points to the fact that this sector includes far more than the public administration. Indeed, within the Political Sector it is health, education and the primary sector which push the share in Edinburgh higher than in the Metro Average. This explains why the share of the Political Sector outside the city is even larger.

The remaining two sectors, the Old Economy and the Traditional Sector, do not play any considerable role for the economic growth for metropolitan regions. The Traditional Sector has stagnated or declined since 1990 in Edinburgh as well as in the Metropolitan Average. The Old Economy, although still growing in some time periods, is too small to contribute to overall growth in a substantial way. Furthermore, in Metro Edinburgh the Old Economy has been in decline over most of the period – a different trend to that observed in the Metropolitan Average. Therefore, neither the Old Economy nor the Traditional Sector can be regarded as having a decisive role in Edinburgh's future growth. This, of course, does not mean that individual firms or specific industries can not be successful in their niches. But for overall economic development, it is unlikely that the Old Economy or the Traditional Sector will have a significant impact on Metro Edinburgh's economic growth.

Summing up, Metro Edinburgh's economy is service driven, as would be expected in a Western European metropolitan region. But within the services sector, Edinburgh's orientation is more towards politically driven parts (Political Sector) than towards typical urban services for businesses and individuals (Urban Sector). Typically, the productivity level of the industries included in the Political Sector is mixed and growth potential is often limited. Furthermore, 'exporting' services from the Political Sector is more difficult than from the Urban Sector and a metropolitan region does need a strong export base to be able to cover the import necessities it has. An assessment of the Political Sector should not only focus on its contribution to growth and productivity. It also provides valuable services, in particular education, which may be critical for future growth prospects. Therefore, a larger educational sector could indicate improved human capital performance, and Metro Edinburgh has a higher share in education than the average metropolitan region. Still, education is only one part of the political sector, and measuring value added is not necessarily identical to measuring the human capital produced. Therefore, doubts remain about whether having a high share of the Political Sector is really advantageous or not. The Urban Sector, although the largest of the five Driver Sectors in Metro Edinburgh, has less weight in Metro Edinburgh's economy than is typical in a metropolitan setting, but it is successful with respect to growth. It is the Urban Sector which explains the success of Edinburgh relative to the Metro

Average since 2000. All regions suffered from the economic downturn at the beginning of the new millennium, but Metro Edinburgh suffered much less than the Metro Average. Furthermore, it is the Urban Sector which explains the renaissance of the City since 2000 within Metropolitan Edinburgh.

In terms of the remaining three sectors, New Economy, Old Economy and Traditional Sector, large growth contributions for Metro Edinburgh in the future are unlikely. With high growth rates resulting in a higher share of the economy than is usual in metropolitan regions, the New Economy was a success in Metro Edinburgh until 2000. However this has not been sustained. From 2000 to 2004 the sector shrank and there is little sign that it will change course rapidly again. The Old Economy, although it might have potential to grow, has a very small share in Metro Edinburgh's economy at the moment. Therefore, even with substantial growth in the sector, its growth contributions will be small. Finally, the future looks bleak for the cost sensitive Traditional Sector in a high wage economy. Therefore, neither the Old Economy nor the Traditional Sector nor the New Economy can be regarded as having a decisive role in Edinburgh's future growth. The sectors providing metropolitan services will be the prize-winning part of the economy of Metro Edinburgh, and here a shift of shares from the Political towards the Urban Sector could improve prospects even further. It seems that – especially since around the year 2000 – Metro Edinburgh has turned a positive corner in terms of overall direction.

3 Edinburgh under the Benchmark Lens

Regional economies differ in their historic development and starting conditions, in their economic strategies and, last but not least, in their success. While the last chapter gave a comprehensive view of the development of Edinburgh's economy since 1980, comparing Edinburgh only with averages – UK average, Metropolitan Average and a Western European average – neglects regional diversity.

Averages provide much information, but can mask important information. There are regions performing far better than the metro average, and other regions performing much worse. Under such circumstances, even if Metro Edinburgh performs better than the average, it can still learn from the top performing regions – particularly from successful economic development strategies. The “average” strategy of successful regions might not be a promising strategy at all. Instead, the average can hide two (or more) strategies with completely different – and possibly opposing – focal issues both of which might be successful. This would for example be the case if regions base their strategies on clusters, but in different industries for which different location factors are important.

Therefore, the following chapter presents a comparison of Metro Edinburgh with 19 other Metropolitan regions. This allows benchmarking of Metro Edinburgh against an average and against other regions including the combination of economic performance, location factors and strategies followed in those regions. In addition, data for the UK, Western European and a Metropolitan Average are provided. In this analysis it must be noted that the Metropolitan Average is based on 26 European and 2 US metropolitan regions¹⁰ and not the limited number of benchmarks in the sample.

The regions selected for the benchmarking exercise fulfil two contradictory requirements. On the one hand, they are similar enough to Metro Edinburgh to avoid comparing apples with oranges. On the other hand, they differ enough from Edinburgh to reflect a wide variety of economic settings, structures, strategies and levels of success.

First of all, all regions selected follow a concept of functional metropolitan areas. There is no sense in comparing regions that constitute only a part of a metropolitan region (when metropolitan region is defined as a functional urban area) as any analysis of their performance and location factors would be biased. In particular,

¹⁰ See Appendix for details. Notice that ‘Metro Average’, ‘Average Metropolitan Region’, ‘European Metro Average’ and similar terms are used interchangeably and always refer to the same average. It is the same average as used in Chapter 2. Notice that the average is not built not from the benchmarking sample but rather from 26 European and 2 US metropolitan regions with data available.

using functional regions, which are usually defined according to commuting patterns, reduces the problem of work versus living location which can bias results tremendously.

This concept of the functional urban area must be followed for Metro Edinburgh as well: Edinburgh City is not used in the benchmarking chapters, but the delimitation used is always Metropolitan Edinburgh. The benchmarks selected follow the same pattern: All have large cities at the centre, but are defined much more broadly¹¹. In addition the benchmark metro regions are classified in terms of type of economy (see box below).

Common characteristics for three groups of regions

To ease the analytical task the regions can be divided into three different groups, the Anglo-Saxon group, the Nordic group and the Continental European group (or "Continental")¹².

- **Anglo-Saxon:**
The regions are characterised by a liberal organisation of markets (product as well as labour) and a relatively less extensive social security system. The economic system is based on individual freedoms and responsibilities. UK, Irish and American regions belong into this group.
- **Nordic:**
The regions show a liberal product market and often also liberal elements in the labour market. They have a developed social security system. The regions' economies are driven by innovation and innovation supporting policies. Regions in Scandinavian countries belong into this group.
- **Continental:**
Although in the last 25 years product markets were liberalised in these regions as well, they are still more regulated than in the other groups. Labour markets are heavily regulated, and social security systems are extensive. The government influence in the economies is high. Most continental European regions belong in this group.

All benchmarking regions are from highly industrialised countries and, in most cases, are European. Apart from this, the regions are of different sizes, and in the selection process, regions from different countries and economic systems were given preference. The regions also reflect different industrial foci but as far as possible, special interest was given to industries important to the Metro Edinburgh economy. Finally, they reflect a variety of more and less successful regions, although there is some emphasis on more successful metro regions because one goal of benchmarking is to learn from the best.

¹¹ See Appendix for details on the regions used and their precise definitions.

¹² The Appendix defining the regions does also provide information which group they belong to. Irish and Scottish regions are part of the Anglo-Saxon group although they historically do not belong there. But from an economic point of view, they belong into a group with English and American regions. It could be called the Anglo-Celtic group. But the term Anglo-Saxon is well-established and understood. Therefore, it will be used throughout this analysis. The Swiss regions are somewhat difficult to sort into the scheme but are included in Continental.

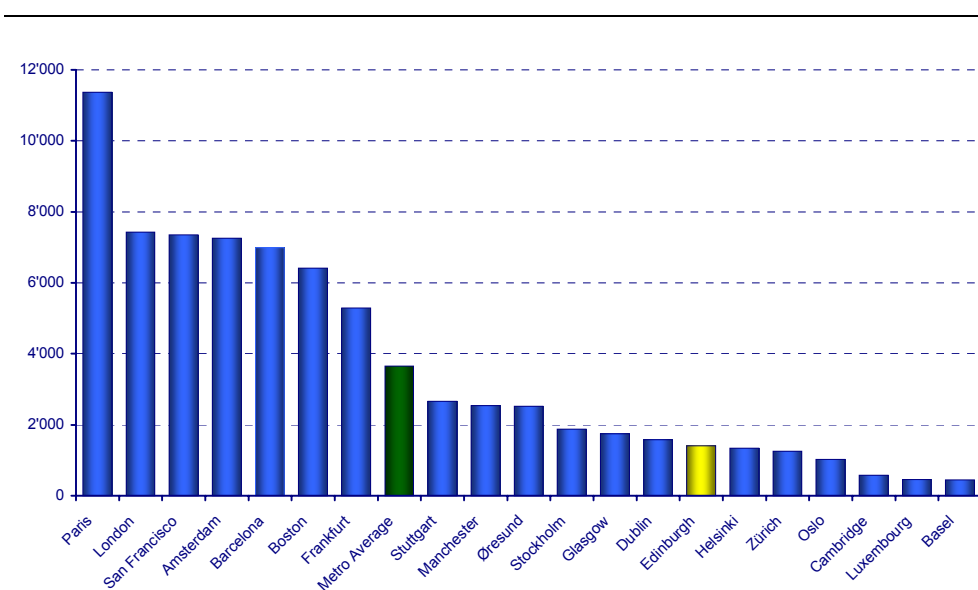
There are clearly some difficulties with definitions of regions, as the definition of regions has to follow data availability, and data is only available for administrative units. The administrative region “City of Barcelona” for instance is much too small and does not cover the entire functional region. The alternative is to include the whole province of Catalonia. Of course, in doing this, some areas are included which do not belong to the functional region of Barcelona. Therefore, using data for Catalonia to reflect the metropolitan region of Barcelona does introduce a bias – but so would using data for the City of Barcelona, and the bias would be more pronounced. The benchmarking uses the data for Catalonia. But when analysing the position of Barcelona or trying to explain any unusual findings for this metro region, the difficulties of defining the regions and the possible data biases should be kept in mind¹³.

3.1 Benchmarking Economic Performance

3.1.1 Population

Fig. 14: Population 2004

in 1,000 persons



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

¹³ For some other regions this problem exists to some extent as well, but Barcelona is by far the most extreme example in the sample of benchmarking regions used here.

The first step in a benchmarking analysis is to compare the population of the metropolitan regions. The range is very large, reaching from about half a million inhabitants in Basel and Luxemburg to more than twenty times this figure in Paris. There are clearly two separate groups. The first group are the mega-metropolitan regions with more than five million inhabitants. These regions often include several cities which are hard to split into individual functional regions. Indeed, they build one functional region together, like, for example, in Frankfurt or in San Francisco.

Metro Edinburgh belongs in the second group of metropolitan regions, i.e. those with 0.5 to 2.5 million inhabitants. With 1.44 million inhabitants, the region is far smaller than London or Boston. Scotland as a whole is smaller than some of the larger benchmark regions. In terms of size, Metro Edinburgh clearly plays in the mid-size, secondary league of city regions.

In the following sections, all of the indicators highlighted rely on relative measures which take the different size of the regions into account. The purpose of using these relative indicators is to be able to benchmark Edinburgh against e.g. London and possibly learn from London's success. Of course, size itself might be a critical success factor and should therefore not be forgotten in the analysis.

3.1.2 GDP per capita

The most important indicator used to compare economic performance is Gross Domestic Product (GDP). The GDP measures the value of all goods and services produced within a geographical unit in a given period of time. To control for size GDP per capita is used.

The chart shows that while Metro Edinburgh is above the UK and Western European average, it is positioned at the lower end of the ranking regarding GDP per capita in 2004. Looking at the data in some more detail reveals the gravity of this finding.

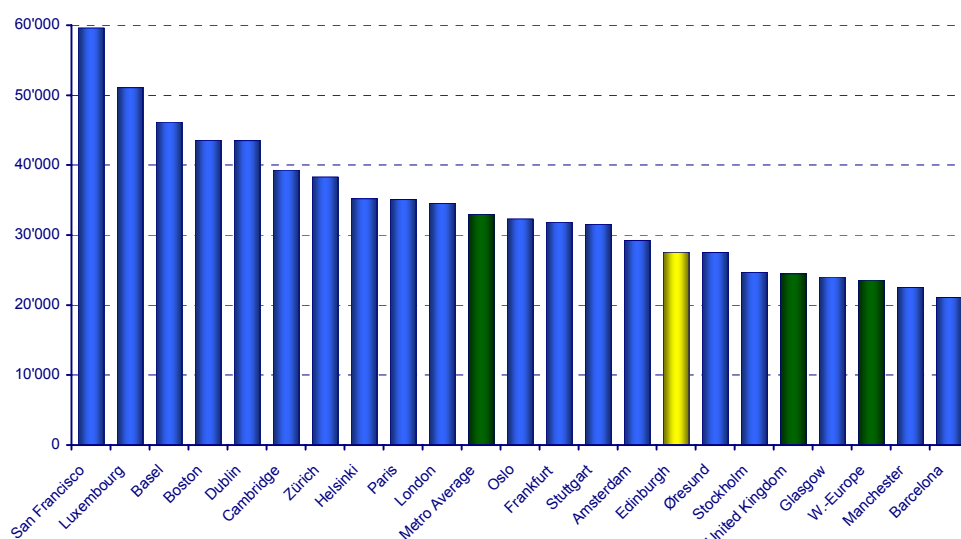
The UK average and the Western European average include many less densely populated and rural areas. These areas lack the advantages of density and economies of scale. They typically display a lower GDP performance. The averages for the UK and Western Europe are biased downwards by inclusion of such areas compared to a metropolitan region. Therefore they are only of limited value as benchmarks for a metropolitan region with regard to GDP performance. The region of Barcelona also includes a huge share of rural areas which is probably one reason for its position at the end of the benchmarking.

Ignoring the above mentioned regions in the benchmarking, the position of Metro Edinburgh among the metropolitan regions looks even worse. Indeed, the GDP of the Average of Metropolitan Regions is 20 percent higher than Edinburgh's: a

significant difference. This is not caused by a few very well performing regions which drive the average upwards. There are only three metropolitan regions in the sample with a lower figure than Edinburgh: two UK competitors, Glasgow and Manchester, and Stockholm. Furthermore, the disappointing position of Edinburgh is not due to the Anglo-Saxon type of the economic system or its position in UK, but rather it is due to region specific influences. The success of regions like San Francisco, London and Cambridge emphasise this point. Indeed, the different economic systems – Anglo-Saxon, Nordic and Continental – seem to have no major impact on the positioning of the regions regarding GDP per capita – the ranking is mixed with regard to the groups of regions.

Fig. 15: Real GDP per capita 2004

in USD (based on USD at 1995 prices and 1997 PPP)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

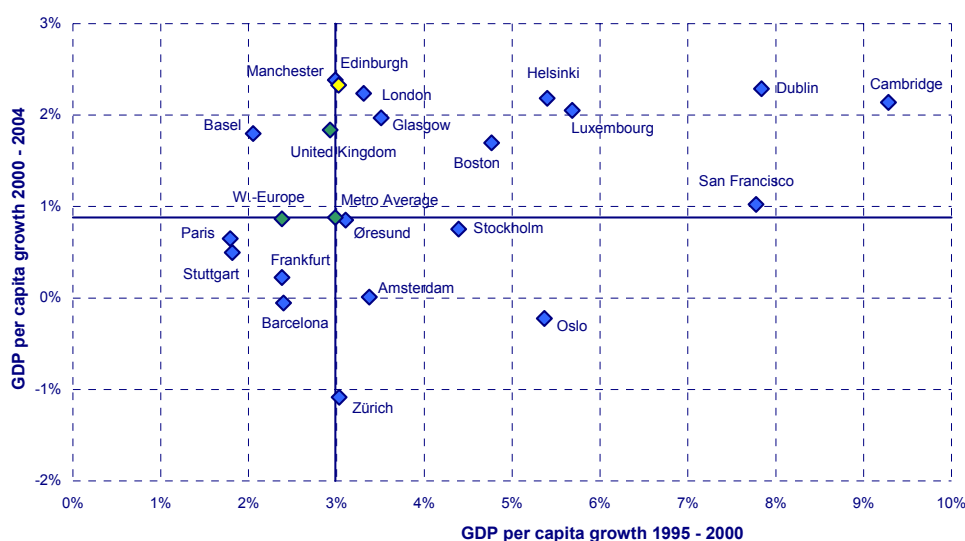
The performance of Metro Edinburgh, as expressed in the central economic indicator of GDP per capita, is less than satisfactory. Analysing the sources of this finding and the factors behind it in more detail provides the focus of the next sections.

Over the last ten years Metro Edinburgh has achieved above average GDP per capita growth. The annual average growth of 2.7 percent is 0.7 percent higher than the Metro Average. Growth is also higher compared with the majority of benchmark regions. However, while Metro Edinburgh has been growing and catching up, it has not been able to close the gap. In 2004, its GDP per capita still lagged behind significantly.

Even the success of Metro Edinburgh regarding growth of GDP per capita has to be qualified. Within the group of Anglo Saxon regions, Metro Edinburgh is among the worst performers. The Anglo Saxon group of regions share more similar framework conditions through the economic system and a more harmonized economic cycle. In the time period in question, the economic cycle was in favour of the Anglo-Saxon regions. Comparing this to regions which are in a less favourable part of the economic cycle during the same time period can bias the results when the long-term economic prospects are of central interest. Regions also profit – or suffer – from framework conditions which are beyond their control. They are set at the national level. Therefore, to evaluate the success of regions' strategic economic decisions beyond the general benchmarking, a comparison within the same group is informative. It is with this comparison that Metro Edinburgh is not doing very well. Much of the success seen in the benchmarking is due to the Anglo Saxon economic system within the UK and not due to achievements of Metro Edinburgh's economy in particular.

Fig. 16: Real GDP per capita growth 1995 – 2000 and 2000 – 2004

Annual average growth rates (based on USD at 1995 prices and 1997 PPP)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built 28 metro regions.

Source: BAK Basel Economics

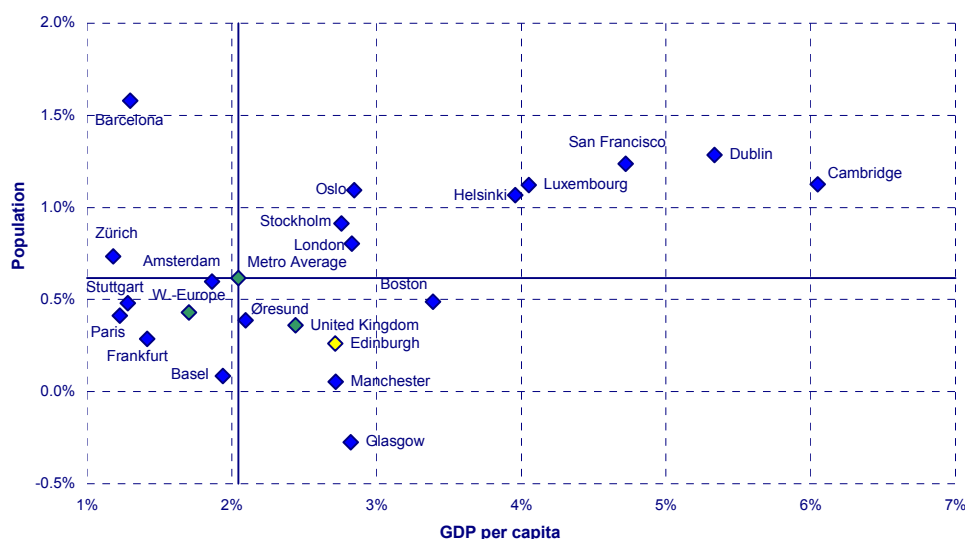
Furthermore, Nordic regions perform as well as Metro Edinburgh over the period. Indeed, the Continental Regions are the worst performers. This is also true for the Metro Average: Continental regions within the average depress it. In fact, all Continental Regions in the benchmarking sample, except for Luxemburg, did worse than the Metro Average from 1995 to 2004.

For Metro Edinburgh, this finding is no real reassurance. It keeps up with its peer group of Anglo-Saxon regions, but just barely. In light of the lower level of GDP per capita observed above, a stronger growth rate would be needed to catch up.

Of course, seen from the perspective of competition between Western European regions for business attractiveness and well-being of the population, it does not matter to Metro Edinburgh whether its success is due to its location in the UK or to specific regional reasons. This is certainly the more important result from benchmarking. There is a danger that if, at some point, the favourable factors beyond Edinburgh's influence become less favourable Metro Edinburgh might find itself in a weak situation. It should be Metro Edinburgh's goal to profit from good UK conditions in addition to fostering specific regional success.

Fig. 17: Growth of real GDP per capita and of population 1995-2004

Annual average growth rates (GDP based on USD at 1995 prices and 1997 PPP)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

Turning to population growth, the findings for Metro Edinburgh are less than encouraging. Whilst the population did grow over the period 1995 to 2004, it was only by 0.25 percent a year. Only three regions, Basel, Manchester and Glasgow, grew less than Metro Edinburgh. On average, metropolitan regions grew at 0.6 percent annually. Even the UK grew 0.35 percent annually over the period.

Population growth or decline is considered to be one of the most important success factors for regional growth and development. It is considered a good indicator for the success of regional policy since people often "vote with their feet". There is a

clear correlation between GDP and population growth, with some exceptions like Barcelona notwithstanding. This correlation appears to hold for Metro Edinburgh, with relatively low levels of GDP per capita and low population growth. As has been argued above, after controlling for the group of regions, Metro Edinburgh's GDP growth is at the lower end of the scale. The low population growth rate fits into this finding.

It should be noted that there is some indication that the position of Metro Edinburgh has improved in the last few years. Population growth was fairly strong in recent years. Even more impressive is the success in GDP per capita growth since 2000. While for the time period 1995 to 2004 Metro Edinburgh is positioned in the middle of the sample, it ranks second in GDP per capita growth for the period 2000 to 2004. Of course, this result is based on a very short period of time, and some caution is necessary. But it could be a hint that Metro Edinburgh has turned a corner in recent years. Still, it should not be forgotten that Metro Edinburgh's GDP per capita regardless of this recent success is still at the lower end.

3.1.3 Employment

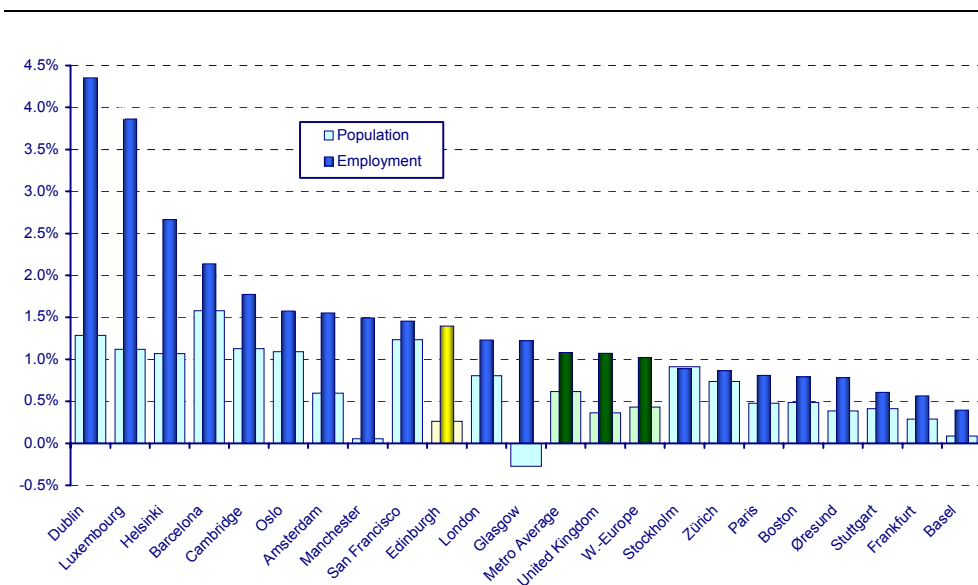
Lack of employment opportunities can contribute to low levels of population growth. This does not however appear to be the case in Metro Edinburgh. In fact, the city and wider region actually gained jobs over the period at a rate of 1.4 percent annually, much faster than population growth. This is a slightly faster growth rate than the Metro Average, and is somewhere in the middle of all regions as well as within the group of Anglo-Saxon regions. Still, Metro Edinburgh did not perform as well as top job creating regions like Dublin, Luxembourg and Helsinki. However, there are similarities between Metro Edinburgh, Metro Glasgow and Manchester and these three leading regions. Each of these regions has been able to increase employment much faster than their populations grew. In other words, like these successful regions, their employment-to-population ratio increased substantially. There are two possible mechanisms behind changes in the employment-to-population ratio.

Firstly, changing commuting patterns across regional borders will influence this ratio. The concept used to define the metropolitan regions, the Functional Urban Area, should minimise such influences, as a neutral commuting pattern is precisely the indicator used to delimit a functional region. But commuting patterns can change, and in some cases, the available data did not allow for a close adherence to this concept. Therefore, in some cases the commuting pattern could bias these findings. One such case is Luxembourg where international commuting plays a substantial role.

Secondly, an increase in the employment-to-population ratio can stem from increased employment of the resident population. Such a development would be good news for a region, from a macroeconomic point of view as well as for the inhabitants. Macroeconomically speaking, it means that the available pool of labour input is put to better use. At the same time, an increased ratio of jobs per inhabitant is equivalent to improved employment opportunities for the population. In this important regard Metro Edinburgh has experienced quite some success since 1995, in absolute terms as well as compared to other metropolitan regions.

Fig. 18: Growth in employment and population 1995-2004

Annual average growth rate



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

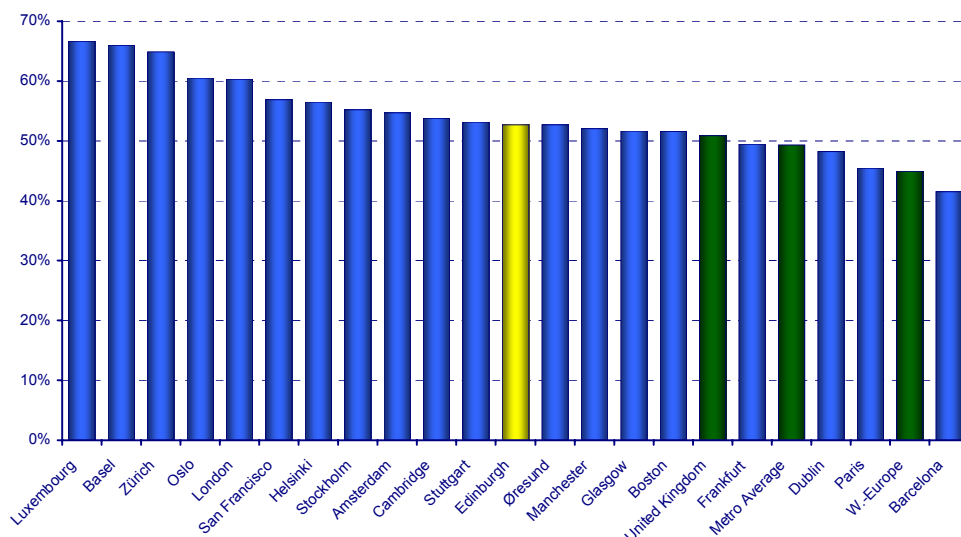
Although Metro Edinburgh had success in increasing its employment-to-population ratio, the percentage of the population in employment is not especially high in 2004. These figures have to be interpreted with care, as different metropolitan definitions might heavily influence them. As had been argued before, some of the metro regions probably have a substantial inflow of commuters from outside the metro regions, and they show up high in such a ranking. For Luxembourg and Basel, it is known that international commuting is high – this has to be ignored in the metropolitan definition.

Interestingly, there is also no clear influence of the economic system. It would be expected that the economic system, especially the organisation of the labour market and the social security net, would influence the employment behaviour. But

for none of the groups of regions, Nordic, Anglo-Saxon or Continental, can a systematic positioning in the ranking be observed.

Fig. 19: Employment-to-population ratio 2004

in %



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

3.1.4 Productivity

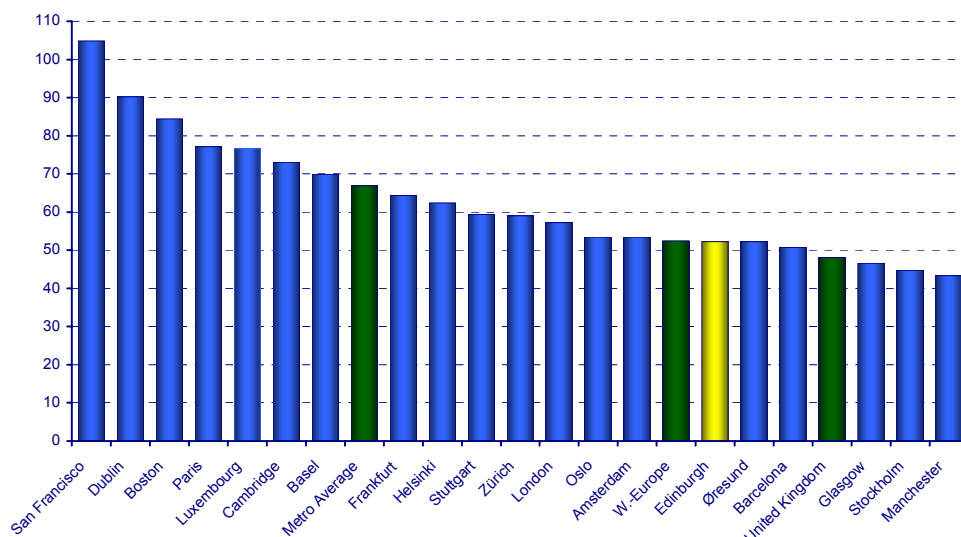
Productivity in Edinburgh is amongst the lowest of all metropolitan regions in the sample. Edinburgh ranks 15th out of 20 metropolitan regions in productivity per employee in 2004. Only Glasgow, Manchester and Stockholm have noticeably lower levels; Øresund and Barcelona are – like Amsterdam and Oslo – nearly at the same level. Looking at the other end of the spectrum, the 50'000 US\$ produced on average per employee annually in Metro Edinburgh is less than half of what an employee in San Francisco produces. Even within the UK, Metro Edinburgh's strongest competitor, Cambridge, achieves productivity about 40 percent higher.

The relatively poor performance of Metro Edinburgh in relation to productivity levels is similar to its relative performance in terms of GDP per capita. Indeed, the GDP per capita performance rankings are clearly linked to productivity performance. The other component influencing (by definition) GDP (per capita), the labour input (per capita), has less influence on the position of the regions. Comparing the rankings of GDP per capita and productivity levels, only a few regions significantly change

their ranking due to differences in the labour input. Productivity levels vary much more between regions than the employment-to-population ratio.

Fig. 20: Productivity 2004

Real GDP per employee, in USD (based on 1995 prices and 1997 PPP)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

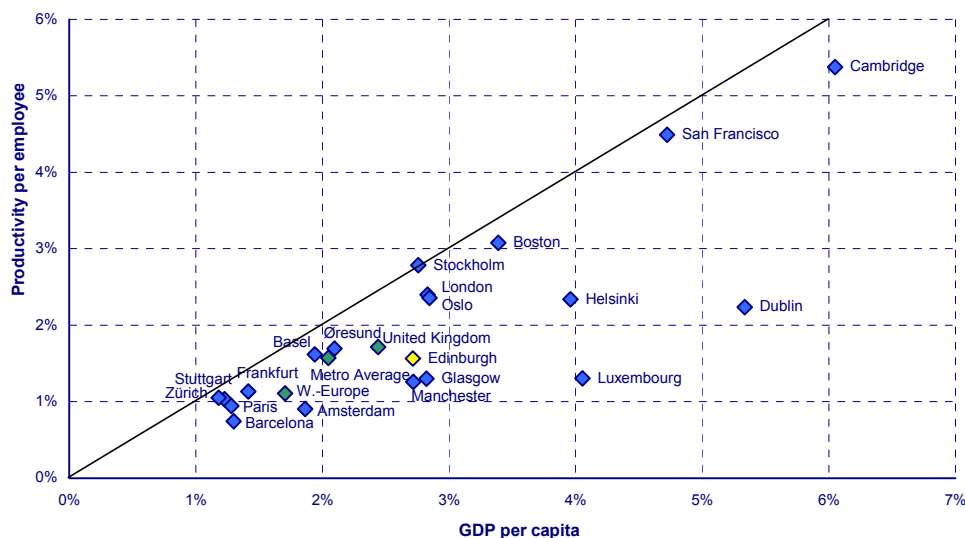
Source: BAK Basel Economics

Not surprisingly, there is clearly a relationship between growth of GDP per capita and productivity growth. The correlation is obvious from the graph plotting GDP per capita growth (X-axis) against the growth of productivity (Y-axis). All regions also experienced a growth in employment per capita as seen from the fact that all regions are below the 45 degree line. But their distance to the 45 degree line is quite different which means the amount that the employment-to-population ratio increased in the regions differs.

Metro Edinburgh is mid-table as far as GDP growth is concerned. We already know that GDP per capita growth is at a mid position and the same is true for productivity growth. The findings are again less optimistic when limiting the benchmarking to the Anglo-Saxon group. Within this peer group of regions, Metro Edinburgh is still at the lower end regarding productivity growth, only surpassing Glasgow and Manchester by a small margin. The Anglo-Saxon regions on average perform better than the sample average, probably due to more liberally organised markets and a more favourable economic cycle. Since Metro Edinburgh belongs to this group and enjoys the positive influence of these framework conditions as well, a better than average position in the benchmarking sample could be expected.

Fig. 21: Growth in real GDP and productivity 1995-2004

Annual average growth rate of real GDP and real productivity per employee
(based on USD at 1995 prices and 1997 PPP)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

More positive are the results for the increase in the employment-to-population ratio. Metro Edinburgh is amongst the better performing regions, although not at the top. Of interest is the success of the Nordic group of regions. The Nordic regions typically foster a strong innovation policy. This seems to be rather successful. Their GDP growth relies to a large extent on productivity gains only, but these productivity gains are high enough to push them into good positions when GDP per capita growth is compared. The innovation policy allows them to achieve significant GDP growth without giving up their extended social system or higher level of market regulations compared to Anglo-Saxon regions.

3.2 Benchmarking the “Five Driver Sectors”

Turning to a more industry specific view, the concept of the five Driver Sectors introduced in Chapter 2 will again be applied: New Economy, Old Economy, Urban Sector, Political Sector and Traditional Sector.

3.2.1 New Economy

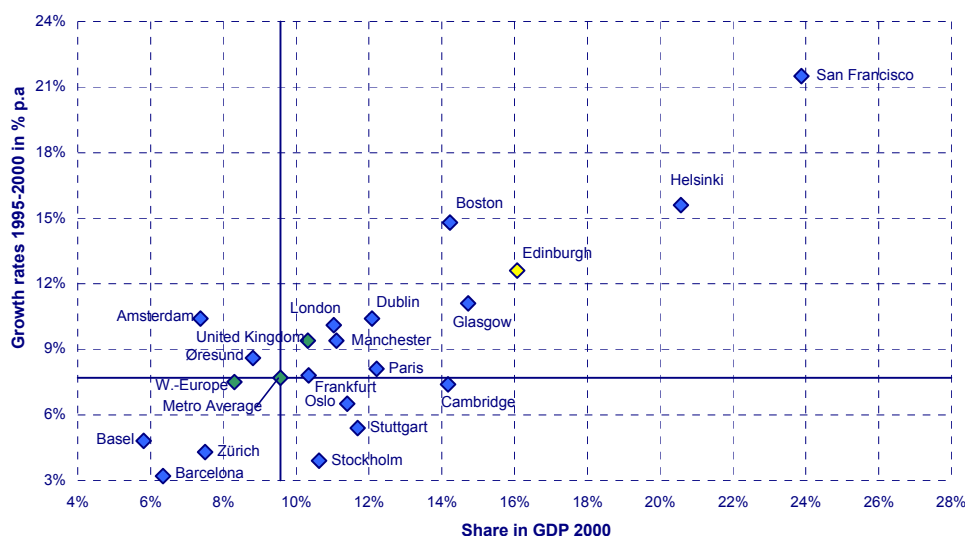
As with all the regions in the sample, Metro Edinburgh’s economy got an important boost from the development of the New Economy sector in the last ten years. However from 1995 to 2004, the average annual growth of this sector was 7 percent, while the Metro Average was close to 9 percent. The growth average from 1995 to 2004 masks the different development phases of this sector. Between 1995 and 2000, this sector experienced boom, followed by a significant period of decline between 2000 and 2004. For a better understanding of the developments, the two periods 1995 to 2000 and 2000 to 2004 are separated in the case of the New Economy.

From 1995 to 2000, Metro Edinburgh profited tremendously from the New Economy boom. Average annual growth was about 13 percent and in 2000 the New Economy made up about 16 percent of Metro Edinburgh’s economy. Only San Francisco, Boston and Helsinki had higher levels of growth. Growth in the other benchmark regions was lower, although all regions experienced a substantial growth in the New Economy.

There was a clear ordering of the benchmark regions by geographical groups. The Anglo-Saxon regions were in the lead both in terms of growth of the New Economy and its share of GDP. This can be explained largely by their liberal economic system which allowed quick adoption of new technologies. They also had strong incentives to innovate. The Continental regions were less quick to adapt to the new technologies and therefore lagged somewhat behind. The Nordic regions (except Helsinki) were in a middle position. Although not as flexible or quick as the Anglo-Saxon regions in adopting new technologies and in pursuing new business opportunities, the Nordic regions’ explicit innovation policy supported the development of the New Economy. Much of the innovation policy focused on educational issues which improved the flexibility of the economy even without liberalising markets as much as in Anglo-Saxon regions. One reason that the growth of the New Economy still lagged behind the Anglo-Saxon regions might be the lack of strong incentives for entrepreneurs in the Nordic system. Their social security system and the high tax burdens made it less attractive for entrepreneurs to take on high risk investments.

Fig. 22: Growth contribution of the New Economy 1995 to 2000

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Reading example: The Graphs are equal to Fig 11 to Fig. 13, except here, they do not have 'bubbles' to represent the growth contribution (it would not be readable). The x-axis holds information on the share of the region (in percent). The y-axis reflects the average annual growth (in percentage points). Therefore, the growth contribution increases when moving from the lower left corner towards the right and/or upwards. See also box in Chapter 2.

Reading example: In Edinburgh, the share of the New Economy reached 16 percent in 2000. The average annual growth from 1995 to 2000 was 13 percent. The contribution of the New Economy to annual growth in the period 1995 to 2000 was around 2 percentage points. This is one of the largest growth contributions observed in the benchmarking sample. Only in San Francisco, Boston and Helsinki did the New Economy contribute more to growth; In San Francisco and Helsinki, this was due to a higher share and faster expansion. In Boston, the New Economy Sector developed more dynamically than in Edinburgh. But due to the lower share in Boston the growth contributions are almost equal.

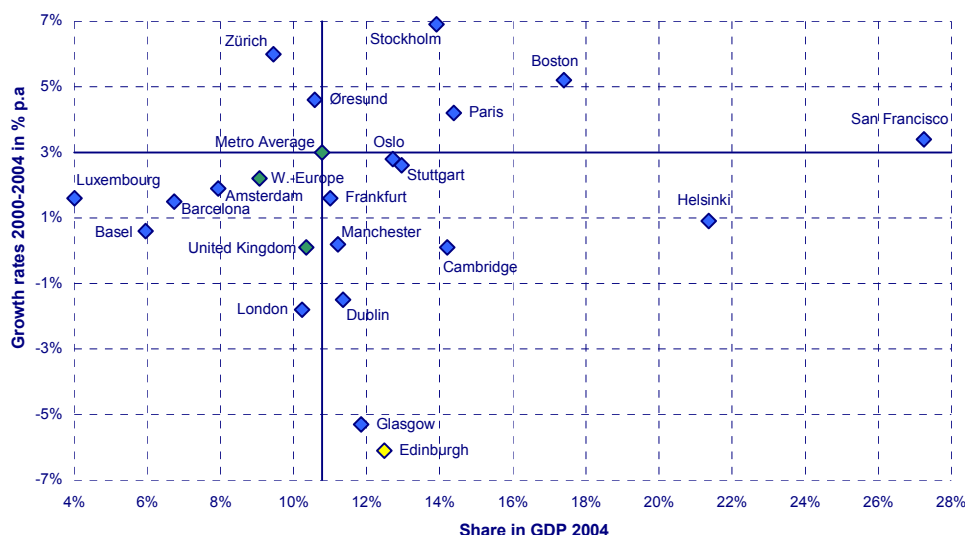
Source: BAK Basel Economics

A completely different picture emerged for the period 2000 to 2004. Over this period general growth slowed – everywhere. In addition, the regional order changed quite dramatically. The Nordic regions did comparatively well in this period except perhaps for Helsinki which showed the slowest growth in this group. The Anglo-Saxon regions split in two separate groups with the US regions remaining amongst the best performing regions. The other Anglo-Saxon regions' performance was the poorest of all benchmarking regions. In some cases, the New Economy sector actually declined from 2000 to 2004. As a consequence of this, the Continental regions moved up to occupy the positions mid table. Because of their slower growth history prior to 2000, the share of the New Economy among Continental regions was still smaller than in Anglo-Saxon and Nordic regions. As the size of the growth contribution of a sector to GDP growth depends on the growth of the sector as well as the share the sector has in the economy, the difference in the development of the New Economy sector from 2000 to 2004

between Anglo-Saxon (except US) and Continental regions would be less pronounced if growth contributions were put at the centre of the analysis.

Fig. 23: Growth contribution of the New Economy 2000 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

Turning again to Metro Edinburgh, the New Economy declined substantially between 2000 and 2004. Of course this downturn had a cyclical component, and there is an expectation that the New Economy will recover. Clearly Metro Edinburgh was much harder hit than other regions, including other UK regions.

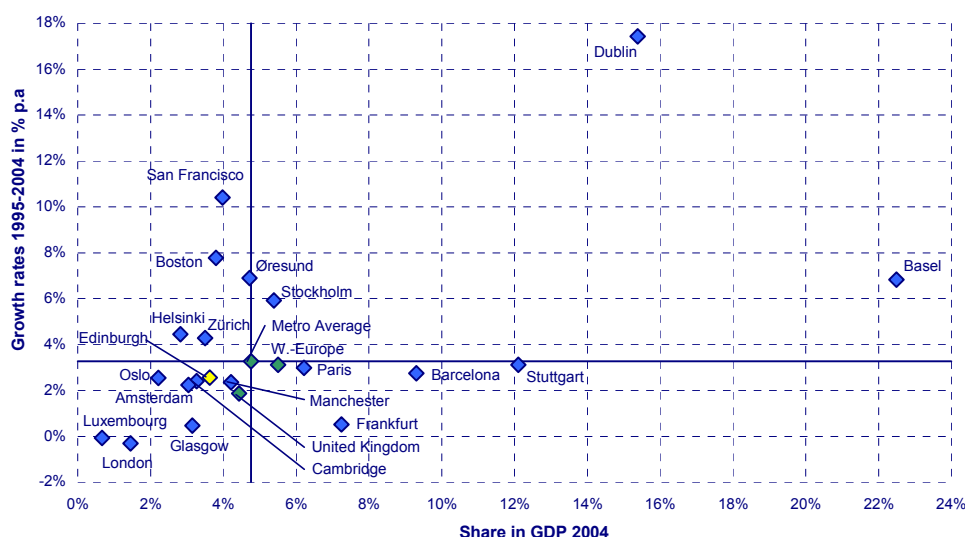
A more detailed analysis reveals that the growth 1995 to 2000 was powered by several industries, especially production of computers and office equipment and the telecommunication services. These two are also responsible for the high share of the New Economy in Metro Edinburgh compared to the Average Metropolitan Region. The sharp decline Metro Edinburgh experienced in the New Economy following the year 2000 results from a decline in the production of hardware. It seems Edinburgh's growth in the New Economy built to a large extent on hardware production, a part of the New Economy witch was not sustainable in Metro Edinburgh. Plant closures and staff reductions in companies like Motorola, NEC Semiconductors and Solectron are large examples, but these are followed by numerous smaller ones. Even if the New Economy recovers, much potential in Edinburgh is gone. It is hard to see how the New Economy could again be a major driver of economic growth in the near future.

3.2.2 Old Economy

Along with the New Economy, there is a group of industries classified as the Old Economy which achieve high levels of productivity and value added and are dependent on technological development. Among these industries are the production of precision and optical instruments, the automotive industry and Life Sciences, to name just a few. These industries, if they can manage to stay competitive and at the leading edge of technological developments, have the potential to shift a metropolitan economy into a higher gear.

Fig. 24: Growth contribution of the Old Economy 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

There have been two really huge Old Economy success stories in the last 10 years within the benchmark sample: Basel and Dublin. In both cases, their shares in the regional economy as well as their growth rates are far above average. Together, this has led to a huge contribution to regional growth (clearly annually more than 1 percentage point of overall economic growth in the regions is attributed to the Old Economies). Stuttgart, Barcelona, Boston and San Francisco have all benefited hugely from the presence of the Old Economy in their region even though in terms of overall growth contribution, the Old Economy's influence was substantial but clearly less extreme than in the two regions mentioned first. The Continental regions have relied on already large shares of the Old Economy in their regions for their success, but have only been able to keep up with the average regarding the

growth of these industries. Interestingly, the opposite has been the case for the US regions. They display a strong growth performance combined with a below average share. The Nordic regions share a similar pattern although it is less pronounced. Meanwhile the UK regions and the remaining Continental regions have shown a comparatively weak performance in the Old Economy. It is interesting to note a difference to the finding that the group a region belongs to explains much of the development of the New Economy. The groups of regions sharing a similar economic system – Anglo-Saxon, Nordic and Continental – do not share similar experiences in the development of the Old Economy. Other factors less dependent on the general economic system appear to be more important for the performance of the Old Economy. These could very well include – very often historically grown – clusters, the availability of high quality research institutes and specific human capital in the regional labour force, amongst others.

For Metro Edinburgh itself the share as well as the growth of the Old Economy was below the Metro Average. Still, the Old Economy did grow, and Metro Edinburgh's economy enjoyed a positive although small growth contribution from this sector. Furthermore, Metro Edinburgh's position in the Old Economy is among the best of the UK regions in the benchmark sample and is better than the UK average. The differences within the UK are small so the advantage of Metro Edinburgh is minor – except compared to London. But London's economy does rely on the service sector, and a huge share of the Old Economy would not fit with such a strategic positioning anyway.

To sum up, the data suggests that the Old Economy could be developed further in Metro Edinburgh. However, there is strong international competition and some of the metro regions already have a large share of this sector and effective strategies in place to support it. Furthermore, with a share of around 4 percent of the economy, it seems hard to imagine that the Old Economy on its own could be the driver for Metro Edinburgh's economy for the next few years. Although a substantial contribution could be possible, other driving forces have to be exploited as well to achieve an overall satisfactory economic performance.

3.2.3 Urban Sector

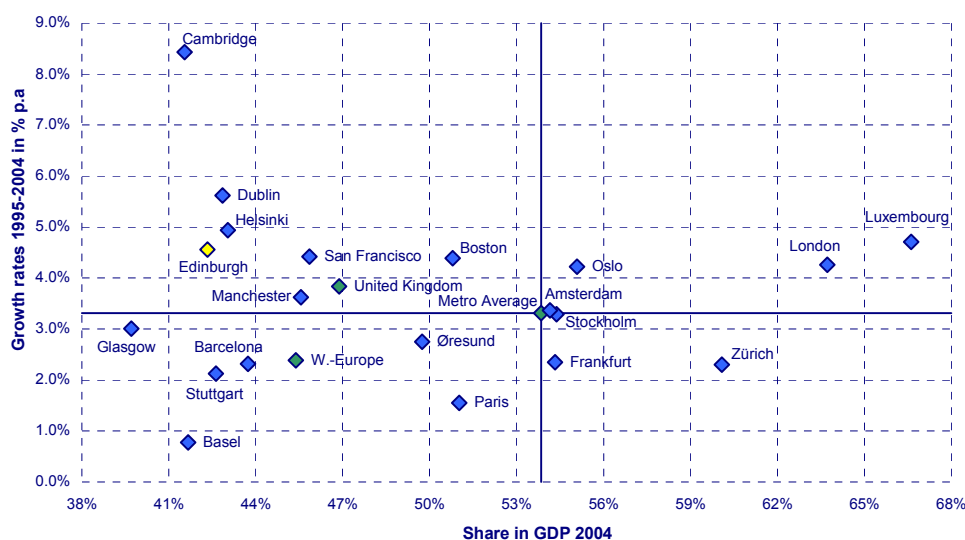
Not surprisingly, the Urban Sector is the driver of metropolitan economies. On average, more than half of the metropolitan economy is found in this sector. And demand for the services subsumed in this sector is rising continuously, as an average annual growth of 3.3 percent confirms.

Metro Edinburgh is doing less well than its international competitors. Metro Edinburgh does quite well in terms of Urban Sector growth along with Helsinki, Boston, London and Luxemburg. Only Dublin and Cambridge score substantially

better. However the share of the sector is amongst the smallest in the sample, with just above 40 percent of the economy. This limits the contribution the Urban Sector can make to the overall growth of Metro Edinburgh's economy.

Fig. 25: Growth contribution of the Urban Sector 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

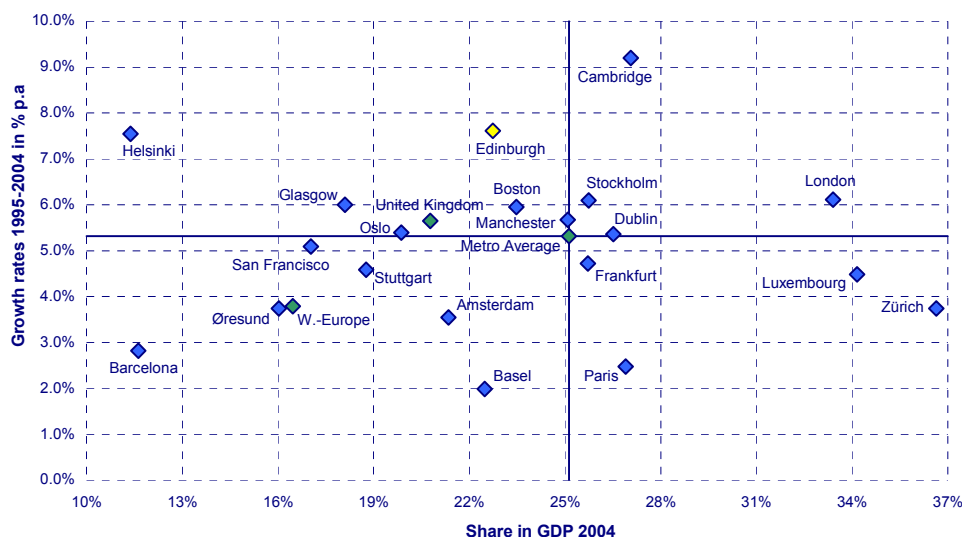
Source: BAK Basel Economics

An assessment of the finer details of the Urban Sector reveals three industries causing Metro Edinburgh's smaller share of the sector. Nearly 5 percentage points of the difference to the Metro Average are due to the real estate sector. A further 2.5 percentage points are due to transportation.

Looking separately at Financial and Business Services (excluding real estate), which are often seen as the core of the Urban Sector and its driver for growth, reveals a much more optimistic position for Edinburgh. The share is only slightly below the share in the Metro Average and Edinburgh's Business and Financial Services have done very well regarding growth in the last 10 years: Only Cambridge beats the 7.6 percent annual growth in Metro Edinburgh. Helsinki is at about the same level. Indeed, growth is so superior in Edinburgh that, apart from Cambridge, only London's Business and Financial Services have contributed more towards growth and overall economic performance since 1995. All other regions with a higher share of this sector lag too far behind the growth in Metro Edinburgh to have a higher contribution.

**Fig. 26: Growth contribution of the Financial & Business Services
(excluding real estate) 1995 to 2004**

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

The Business and Financial Services sector is at the core of the Urban Sector, which in turn, is the most important part of the economy for metropolitan regions. And Metro Edinburgh is doing quite well in this part of the economy. The region seems to be on a positive path of structural change, increasing the importance of these core metropolitan functions. With an increasing share of the economy, the Business and Financial Services should support Edinburgh's performance even more in the future. A section further down will look specifically at the financial sector and its role and potential in Edinburgh.

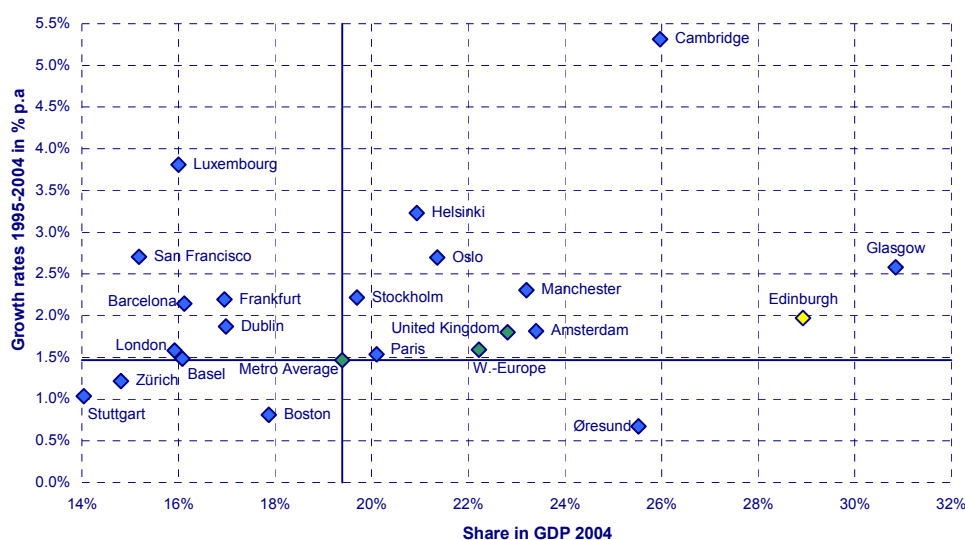
A final note seems appropriate about the discrepancy between the mixed findings for the whole Urban Sector and the much better findings for the Business and Financial Services (excluding real estate). Indeed, it is real estate which causes much of this difference. The real estate business is small and not doing very well in Metro Edinburgh compared to other metropolitan regions. This is a pattern observed for all Scottish regions; Metropolitan Glasgow is facing the same challenge in the Urban Sector. Special institutional settings might be preventing the real estate business in Scotland from getting off the ground the way it has in other metropolitan regions including, notably, in other UK or Anglo-Saxon regions.

3.2.4 Political Sector

Metro Edinburgh has clear strengths in the Political Sector with an above average share and steady growth. Apart from Metro Glasgow, Metro Edinburgh displays the highest share (29%) of all metropolitan regions with some distance between it and the next highest shares in Cambridge and Øresund. Metro Edinburgh has also had above average growth in the Political Sector although it is not at the top position of the benchmarking table.

Fig. 27: Growth contribution of the Political Sector 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

It is interesting to observe that the strong position of the Political Sector seems to be a UK phenomenon, but not an Anglo-Saxon phenomenon. All UK metropolitan regions in the sample, with the exception of London, display a similar structure. The difference in the share originates from several industries. Education and health care make up a higher proportion of the Metro Edinburgh and the UK economy compared to the Metro Average, although this is slightly less pronounced at the UK level. A higher share of education in a metropolitan economy, as observed in Metro Edinburgh, could have a positive effect on regional growth prospects in an indirect way. Investing more into education raises in the long run the level of human capital accumulated. This could be an advantage for Metro Edinburgh, although from a high share of expenditures on education to faster growth there are some hurdles to

cross. To name just two, there's the question of efficiency in education, and secondly the knowledge produced must be put to usage in the region.

In relation to public administration, the UK has a much leaner organisation than the Metro Average. Metro Edinburgh is positioned in between these benchmarks, the UK and the Metro Average, but it is closer to the Metro Average. One reason might be Metro Edinburgh's function as capital city which increases the weight of the Political Sector. However like Metro Edinburgh, many regions in the Metropolitan Average also serve as their region's capital city, while in the UK average it plays a less important role. Finally, agriculture still plays a role in Metro Edinburgh, while in the UK and in the Metro Average, the share of agriculture in the economy is far smaller.

It is questionable whether specialising in the Political Sector, a sector not known as highly productive and whose growth potential seems limited, is a promising specialisation for a metropolitan region. Of course, the function of Edinburgh as capital can partly explain the high share of the Political Sector. The function of a capital is a positive characteristic for a metropolitan region, but even then the potential of economic growth stemming from such a function seems limited.

On the other hand there are certain niches within the Political Sector with potential for high value added growth. For example, providing health services to well-off customers is a fast growing international service with high value added. A similar optimistic future exists for higher education which also has an increasing international market potential. Although both sectors are still dominated by non-profit, publicly provided services, they are becoming increasingly commercially oriented. Metro Edinburgh possesses a number of important characteristics which could provide a considerable comparative advantage for providing such services. The English language, close to being the "common language" of the world, makes it easier for foreigners to choose Edinburgh as the location to receive such services. Furthermore, a "positive" reputation, a liberal society and well-known tourist attractions add to Edinburgh's attractiveness. Finally, the more restrictive policies of the US increase Metro Edinburgh's opportunities in the fields of international services in education and health.

Even if Metro Edinburgh successfully takes on these markets, they will not be more than niches, although possibly highly profitable ones. As niches, they will not have much weight within the larger health and education industries (sectors), and even less within the overall Political Sector. The questions about the future prospects of an especially strong Political Sector remain.

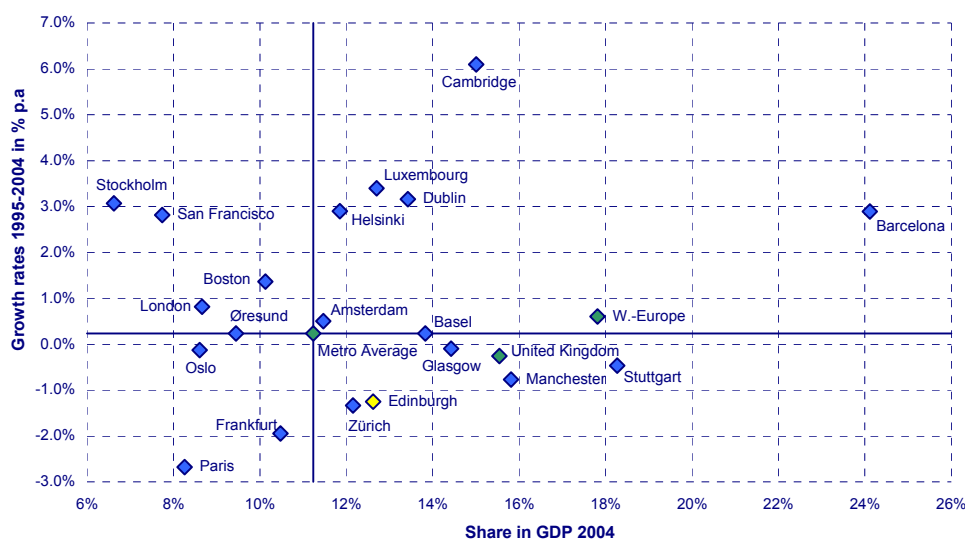
3.2.5 Traditional Sector

The Traditional Sector in Edinburgh is slightly more important than in the average metropolitan region, but it declined in importance between 1995 and 2004. Decline is never good news. But, at the same time, a decreasing share of this sector (which faces tough cost competition) decreases the vulnerability of Metro Edinburgh's economy to the effects of globalisation in the future. There are other sectors with comparative advantages for Edinburgh and other opportunities upon which to build.

The outlook for a sector which requires lower labour costs than exist in Metro Edinburgh is not promising. The competition from low wage regions around the world is intense. Still, some Western European regions manage to stay competitive in high tech niches within the Traditional Sector¹⁴. For a region not already specialising in this sector, a strategy especially focusing on growth in the Traditional Sector is unlikely to bear fruit.

Fig. 28: Growth contribution of the Traditional Sector 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

¹⁴ The benchmarking sample in this report does not include such regions specialized specifically and successfully in Traditional Sector industries.

3.2.6 Lessons learned from the benchmarking exercise

Metro Edinburgh has been benchmarked against a sample of 19 metropolitan regions. The regions chosen as benchmarks are an ambitious sample: It includes the more successful regions. What can be learned from this sample for Metro Edinburgh?

In terms of size, Metro Edinburgh clearly plays in the mid-size, secondary league of city regions. With 1.44 million inhabitants, the region is far smaller than, for example, London, Boston or Frankfurt. Size is important for a number of reasons. Size can help provide a wider range of more specialised services which, in turn, increase productivity. Furthermore, size helps visibility in a global economy. Just as one example, city tourism clearly prefers the larger metropolitan regions with their diverse offerings. Smaller metropolitan regions need to offer much more specific advantages to be as attractive as the larger ones. For Metro Edinburgh, two things can be proposed: Firstly, Metro Edinburgh should be aware of its size. It needs to make more efforts in specialising and offering particular advantages over larger metro regions. Secondly, Edinburgh can seek co-operate to gain size and visibility. The most obvious option is tightening its relationship with Glasgow. But this could also mean co-operation, for example, with London in the division of labour in the financial sector. Services less dependent on the highest levels of concentration and accessibility – as provided by London – could be shifted to Edinburgh where they would profit from lower operating costs. In such a scenario, both regions can win.

The performance of Metro Edinburgh, as expressed in the central economic indicator of GDP per capita, is weak. The GDP per capita in Metro Edinburgh is amongst the lowest in the benchmarking sample and is more than 15 percent below the Metro Average. The same result holds true for productivity, with an even larger gap of more than 20 percent. These measures of economic strength of a region and the wealth produced by and for its inhabitants show that Metro Edinburgh still has some way to go to catch up.

And indeed, Metro Edinburgh did close part of the gap in the last ten years. GDP growth is among the strongest in the sample, although it is driven more by better labour usage than by productivity increases. One major drawback is that Metro Edinburgh's position is less positive within the sub-sample of Anglo-Saxon regions. The impression is that Metro Edinburgh's success within the benchmarking sample is to some extent due to an Anglo-Saxon or UK success. Metro Edinburgh's goal should be to profit from good UK conditions in addition to fostering specific regional success. When doing so, a specific focus should be put on increasing productivity.

From a sectoral view, it is the Urban Sector which is most important for Edinburgh's economy. On the one hand, its share is smaller in Metro Edinburgh than in most

other metro regions. On the other hand, the Urban Sector in Metro Edinburgh has grown faster than in most other regions. Much of this encouraging observation is due to the business and financial services sector, one of the core components of the Urban Sector. Furthermore, it seems to be a rather recent story driven by the development in the City of Edinburgh (see Chapter 2). The renaissance of the city (and the usage of advantages of density and economics of scale and scope) started somewhat late in Edinburgh, but it now seems to be progressing well. Policy should use this momentum and support this process in the future.

The second most important sector in Metro Edinburgh is the Political Sector which is well positioned with respect to share as well as to growth. Even if this is seen as a success, it is questionable whether specialising in the Political Sector is an appropriate growth strategy for a metropolitan region. The Political Sector is not known to be especially productive and its growth potential seems limited. Metro Edinburgh should probably not build its future growth strategy on this sector.

Potential in certain niches notwithstanding, the remaining three sectors are – for different reasons – hard to see as future drivers of growth for the Metro Edinburgh economy. The New Economy was a huge success story in Edinburgh until the year 2000. But since 2000, Edinburgh has had to cope with a substantial decline in the sector, much sharper than in other regions. Even if the New Economy recovers, much potential in Edinburgh is gone. It is hard to see how the New Economy could again be a major driver of economic growth in the near future. The Old Economy is a sector which can shift a metropolitan economy into a higher gear. But in Metro Edinburgh, even if successful, its share is too small to have a substantial influence on overall economic growth, at least for quite some years to come. Finally, the outlook for the Traditional Sector in a high wage Western economy is not very bright. The competition from low wage regions around the world is intense. For a region not already highly specialised in this sector with specific comparative advantages, a strategy which particularly focuses on growth in the Traditional Sector is unlikely to bear fruit.

4 Attractiveness: Measuring and Comparing Location Factor Quality

The discussion until now has focused upon the economic performance and the industrial structure of Edinburgh and its potential competitors. This of course is useful as it allows an assessment of the results from previous economic development and policy, individually as well as in comparison to competitors. Furthermore, the analysis helps understanding the conditions of today which form the starting conditions each policy for the future must take into account. An international benchmarking exercise must also be extended to cover the quality of a location for living, working and doing business. This chapter looks at the strengths and weaknesses of Metro Edinburgh as a location for living, working and doing business.

The quality of the factors determining the attractiveness of a location and the quantity of resources available for innovation and economic development are themselves part of the given starting conditions any policy strategy for economic development must build on. At the same time, policy can influence economic development through influencing these location factors. Therefore, benchmarking location factors is an initial source of information about which policies have been followed in a region. By analysing the best performers, it can help to understand which policies or which policy mix best supports economic growth and which are less successful. Finally, it can help to identify particular weaknesses and help set priorities for the future. Thus, monitoring the quality of location factors and the quantity of resources for economic development are both essential parts of a benchmarking exercise intended to result in a better understanding of future options and more informed policy decisions.

There is a wide variety of location factors that are important for future economic growth and influence the options economic policy has. Examples include the human capital available in the workforce, the public funds available, land reserves and natural resources, and regulations and regional powers to change them, to name just a few. To be useful in an international benchmarking as performed in this analysis, the location factors and the indicators used to measure them must (at least to some extent) possess each of the following properties. They must:

- heavily influence supply side developments, especially the location decisions of companies and the ability to found and grow firms,
- be able to be influenced by government and
- be able to be measured objectively, quantitatively and in an internationally comparable way.

The location factors to be discussed are ordered into four broad topics: Innovation Resources, Regulations, Taxation, and Accessibility¹⁵.

4.1 Innovation Resources

Innovation as a location factor

In principle and by definition, two possible ways to increase economic growth exist: increasing workforce participation and increasing labour productivity. The latter one is closely related to innovation. Although not as precisely defined as other economic concepts and not as straightforwardly measurable, economist widely agree with politicians and the public that innovation is the key component for economic development, especially for highly developed economies. Furthermore, only continuous innovation can guarantee the competitive advantage and therefore the high earnings common in Western European countries.

Innovation itself is not a process directly influenced by regional decision makers. But innovation needs inputs which are, in turn, at least partly governed by regional policy and which can be measured. In a benchmarking analysis, innovation resources are the indicators available to analyse the potential of a region to gain productivity through continuous innovation.

4.1.1 Availability of a highly qualified workforce

The highly developed economies of Western Europe rely on permanent innovation to keep the competitive advantage in a globalizing world and to justify the high earnings levels. Especially in service intensive urban and metropolitan economies, a highly qualified workforce with a high degree of practical know-how is a key factor for sustained economic growth. As there are no direct measures for human capital, indicators have to be used to benchmark a region's position (see box for details).

With more than 35 percent of the labour force having completed a tertiary education, Metro Edinburgh is positioned in the upper half of the sample of metropolitan regions and above the Metro Average as well as the UK and the Western European averages. Still, Metro Edinburgh is outperformed by quite a margin by the leading regions such as Boston (52 %), Helsinki (46 %) and London (44 %). Those regions with labour force education ratings near the top of the ranking are also regions with very good economic growth performance in recent years. Of course, this alone is not a proof of causality: it is possible that a good growth performance makes a region attractive for highly qualified persons and, therefore, the higher share can be explained by the better growth performance and

¹⁵ For some of the indicators, information is not available in regional detail. If appropriate, in some cases, the figures for a geographically larger region have been used. For example, income taxation does not vary regionally in most countries. Therefore, national data can be used. But company taxation does vary, e.g. in Germany. But differences are so small that they hardly matter, and for the sake of simplicity, in some cases national figures have been used there as well.

not vice versa. But econometric research provides hints that a high share of well educated people in the labour force results in better growth performance, at least with some time lag¹⁶.

Indicators for human capital available in a region

Human capital can not be measured directly. Instead, indicators have to be used. Straightforward is the highest level of formal education achieved such an indicator, for which data is available as well.

The indicators which are used in benchmarking are:

- Share of the labour force with a tertiary degree¹⁷
- Share of the labour force with a secondary degree¹⁸ (but not a tertiary)

Of course, these are incomplete measures since they focus on the formal education usually obtained at the beginning of the working life. They do not reflect non-formal education or the influence of work experience and ability and they ignore life-long learning. Furthermore, differences in the education systems between countries might lead to biased results. Still, these are the best indicators available and are widely accepted in international comparisons.

Although some regions are better positioned than Metro Edinburgh, the share of highly educated people in the labour force is higher in Metro Edinburgh than in most other metropolitan regions, especially the regions from continental Europe. Competitors like Frankfurt and Amsterdam have a share below 30 percent. Of course, this good performance could be biased due to differences in the national education and employment systems. This problem can be tackled, in part, in two ways. Firstly, Metro Edinburgh's position can be evaluated against its UK competitors who have broadly the same educational and employment systems. In such a comparison, Metro Edinburgh ranks second behind London.

Secondly, comparing changes over time eliminates the difficulties caused by different education systems. Again, Metro Edinburgh is well positioned. It displays one of the strongest increases of highly educated labour compared to the Metro Average over the last 25 years. Only Helsinki and London surpass Metro Edinburgh, and Glasgow keeps up with it.

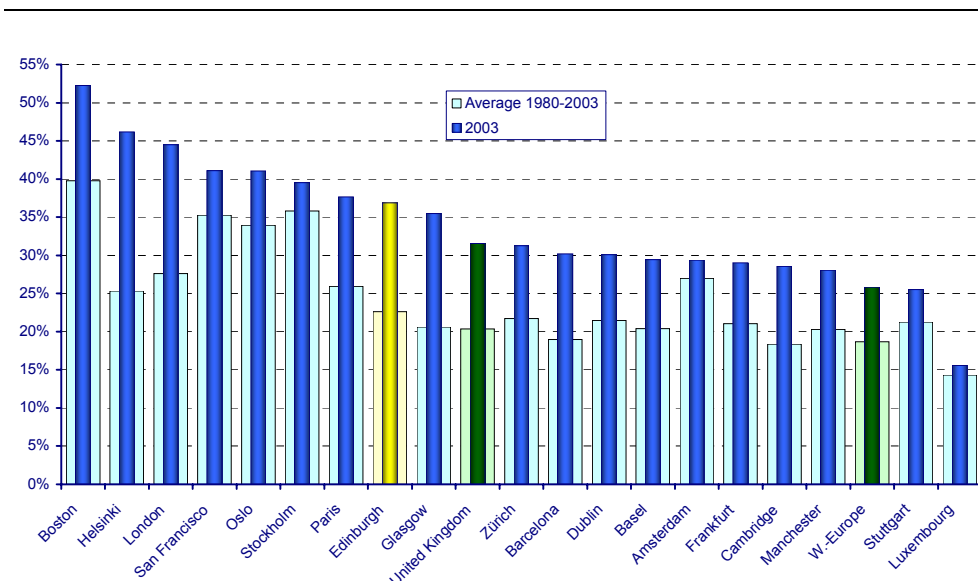
¹⁶ See Eichler, Blöchliger, Grass and Ott (2006).

¹⁷ In the UK, tertiary educations includes: Activities leading to National Vocational Qualification Level 4 or 5 and equivalent, Higher National Certificate (HNC), Higher National Diploma (HND), Diploma in Higher Education, Bachelor's degree 2 (accelerated), 3 or 4 years, open University (bachelor's degree), Post-graduate certificate programme (e.g. teaching), Master's degree programme (short and long): M.A., M.S., M.F.A.), First Professional Degree Programme, Doctorate (Doctor of Philosophy - Ph.D.).

¹⁸ In the UK, secondary education includes: General National Vocational Qualification [GSVQ] Foundation or Intermediate Level, GCSE courses/SCE standard grades, SQA National Certificate Modules, Work-based training for adults, Activities leading to National Vocational Qualification Level 2 and equivalent, Activities leading to National Vocational Qualification Level 1 and equivalent, Traditional apprenticeships, Work-based training for young people (including national traineeships).

Fig. 29: Share of tertiary educated individuals in total employment

Level 2003 and mean 1980-2003, in percent



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Innovation

To cover the structure of a workforce's qualifications completely, another approach is necessary to assess secondary education attainments. Although formally not as well qualified as people with a tertiary degree, a secondary educational degree provides skills and teaches the ability to adapt to different workplace requirements. This substantially improves productivity and the flexibility within the production process compared to the use of labour with only the most basic formal education. Secondary degrees can be analysed individually. But adding up the shares for secondary and tertiary education provides a picture of the share of the labour force qualified, which is more interesting than the share of secondary educated employees alone.

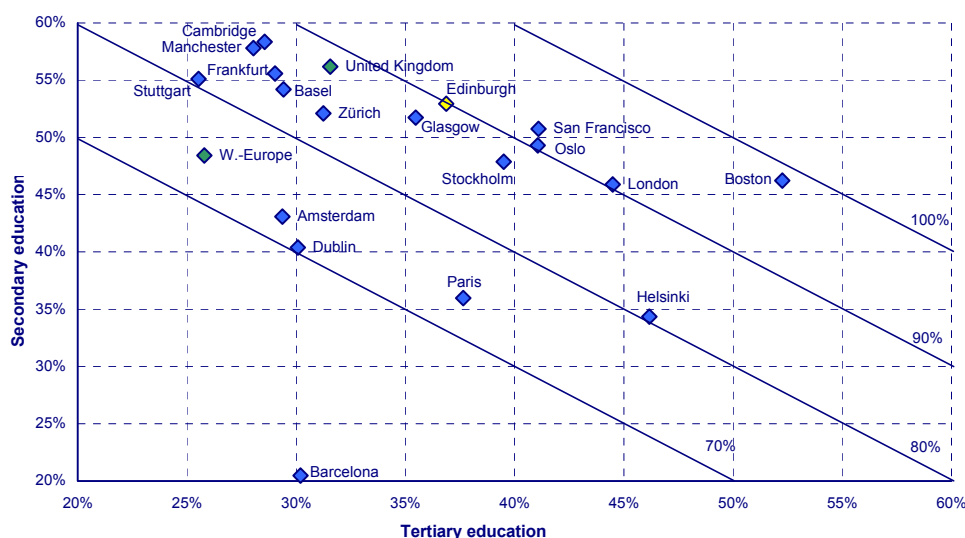
Looking at employees with secondary education qualifications, Metro Edinburgh again ranks quite high. The regions with a higher share of secondary educated people in the labour force usually display a substantially lower share of tertiary educated people than Metro Edinburgh. Summing up the two groups, nearly 90 percent of the labour force in Metro Edinburgh is qualified. Only Boston has a clearly larger share while the share goes down to just above 50 percent for regions like Barcelona.

Although formal education is an imperfect measure for the human capital available in an economy, the benchmarking analysis shows that Metro Edinburgh is quite well positioned to gain from its large pool of well qualified human capital. It is

especially positive that Metro Edinburgh has improved its position in recent years. These dynamics should be used for further advances, especially in attracting more highly qualified people to Metro Edinburgh. As the very successful regions like London and Helsinki demonstrate, there is still room for improvement.

Fig. 30: Highest completed education (secondary/tertiary) in the labour force

Share of individuals in total employment with secondary/tertiary degree, 2003, in percent



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Innovation

Of course, nothing has yet been said about how to achieve this goal. Highly qualified labour can either be produced locally by the education system or can be imported from other regions by creating attractive conditions for such people to move into the regions. At this point, no recommendation can be made as to which of these two ways is the more fruitful. Since the one reinforces the other, elements from both strategies should probably be followed.

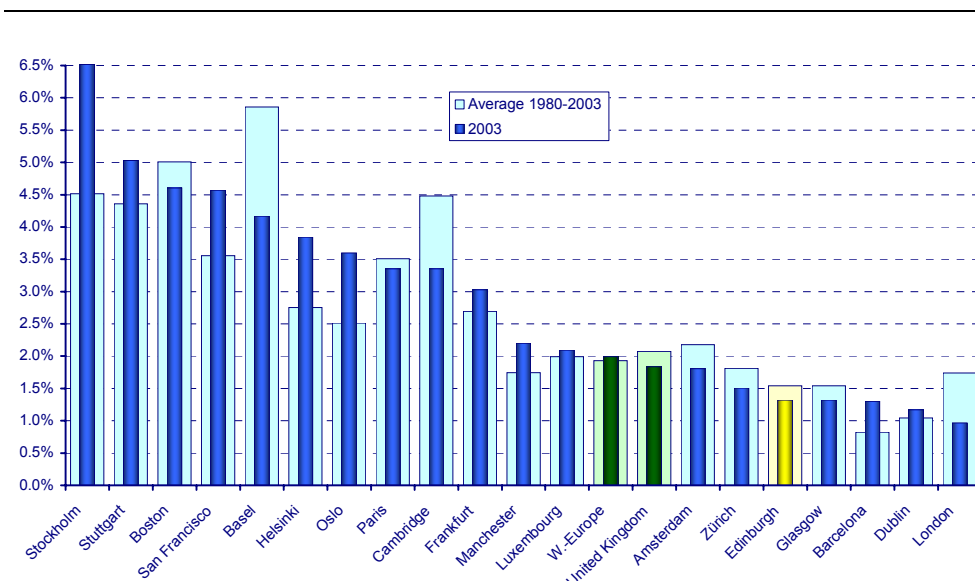
4.1.2 Expenditure on research and development

Innovation is an investment for firms. The amount of money they invest can be measured as research and development (R&D) expenditures. The average amount invested is a measure of the resources available in the innovation process. This is much more directly related to the process itself than the human capital issues discussed above. See box for details on the indicator.

The R&D intensity in Metro Edinburgh is very low compared to other metropolitan regions. With not more than 1.3 percent of GDP spent on R&D, the Metro Edinburgh economy invests only a fraction of what other metropolitan regions do in the innovation process. The performance gap between Metro Edinburgh and other regions for this, admittedly, limited indicator is large. For example, in Helsinki, the share is about 3 times as high (3.8 % of GDP). Compared to the leading region of Stockholm (6.5 %) the difference is in the magnitude of 5 times. Even the Metro Average (2.7 %) is twice as large as the share in Metro Edinburgh.

Fig. 31: Share of expenditure on research and development in GDP

Level 2003 and mean 1980-2003, in percent



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Innovation

To some extent low R&D spending is endemic to the UK. Most UK regions in the sample are in the lower part of the ranking. But even within the sub-sample of UK regions, Metro Edinburgh does not perform well. Only London has a substantially lower share. But a region like London which is focused on services can allow itself a low R&D expenditure ratio. For Metro Edinburgh, such a focus on the services is less obvious though clearly important. The share of producing industries in Metro Edinburgh is close to the sample average of metropolitan regions, yet its R&D expenditures are much lower. Metropolitan regions specialising in producing industries such as Stuttgart in the automotive industry, California and Helsinki in ITC or Basel and Boston in Life Science have much higher shares. This reflects the fact that, in the producing industries, Metro Edinburgh is less a place for headquarters including the research and development department than a place for

a branch office with production plants. In the long run, production plants and branch offices are more vulnerable to international (cost) competition than are headquarters with R&D functions.

The high share of R&D spending in regions known for high tech industries indicates that the pattern of specialisation of metropolitan regions will probably not change in the near future. This proposition is supported by a comparison of current shares with the average between 1980 and 2003. Most metropolitan regions with low 1980-2003 averages of R&D expenditures in GDP show an even lower share in 2003. The opposite is true for metro regions with a high 1980-2003 average. They display shares in 2003 which, in general, are above their own averages. The gap between the best and the worst performing metropolitan regions regarding R&D spending has widened which suggests a tendency towards more specialisation in metropolitan regions.

Indicators for investments in the innovation process

Expenditure on research and development (R&D) measures the investments of firms and the public sector into the innovation process. This figure heavily depends on the size of the regional economy and the metropolitan regions used in the benchmarking are quite different in size. Therefore, the indicator is calculated as a ratio of GDP of a region.

The indicator which is used in benchmarking is:

- Expenditures in R&D as share of GDP

When using this indicator it has to be kept in mind that industries use R&D expenditures very differently. Of course, industries also vary widely in their innovative capabilities, but this is only partly related to different R&D expenditures. Generally speaking, investment in R&D is much more important for producing industries' ability to stay competitive. In services, innovation often takes place in a different way or the necessary expenditures to achieve innovation are not classified as R&D, rather, for example, as marketing. Therefore, when discussing the differences in the R&D intensity in regional economies, the analysis should always look at differences in the industrial structure.

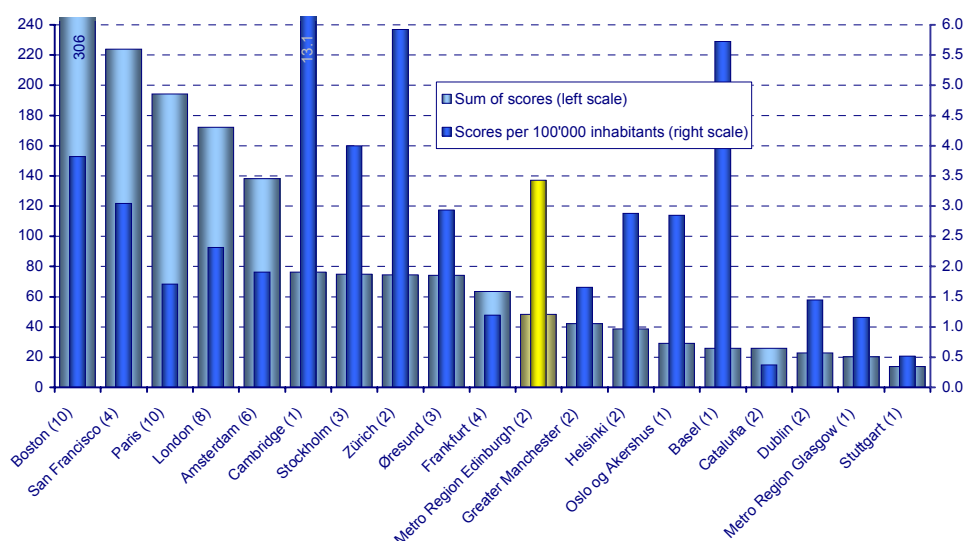
Metro Edinburgh's economy does not invest a high proportion of GDP into R&D; it is far below the Metro Average in Europe and is also far below the EU Lisbon Agenda goal of three percent. For a metropolitan region completely focused on services this is not necessarily a problem. But with a substantial share of producing industries and ambitions to grow in these sectors, R&D expenditures should be closely analysed. Metro Edinburgh should be aware that without substantial efforts to improve its share of R&D, it will be difficult to maintain or gain sustainable producing industries in a high wage setting of a Western economy except for small niches.

4.1.3 Quality of Universities

A further resource used in the innovation process is top quality academic research. Although not usually considered innovation by a strict business definition, academic research is often the first step of a longer innovation process that eventually leads to economically relevant innovations. Therefore, a relevant factor in innovation is the research potential embodied in universities located in a region.

Fig. 32: Sum of scores of all included universities in a region

2004, total scores and per 100'000 inhabitants, in brackets number of universities included per regions



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Innovation

Edinburgh's universities perform quite well regarding their research potential. They rank just behind the leading regions in the sample when controlled for the size of the regions. At the very top of the ranking, we find Cambridge, Zürich and Basel. Behind these leaders Metro Edinburgh is in line with Stockholm and Boston. Boston, which is one of the most prominent university locations worldwide, clearly comes out first in the ranking when not controlling for the size of regions (10 universities and more than 300 points in total). It is followed by the other very large metropolitan regions like San Francisco, Paris and London. They score far more points than Edinburgh. For example, London with 8 institutions included has about 3 times as many points as Metro Edinburgh, but this is primarily due to the size of Metropolitan London. The average number of points per institution included is lower in London, as are its scores per capita.

Although not at the absolute top, when the size of the regions is taken into account, Metro Edinburgh does play in the top league for the best academic research facilities. Serious competitors come from a few other UK regions, the US and some Nordic regions. Most continental European regions do have high quality research, but at a different level. It is a potential Metro Edinburgh could use, but set within the context of low R&D expenditures, does Metro Edinburgh's economy really use the potential the academic research provides?

Measurement of University quality

An indicator used to measure the top academic potential of universities is the Shanghai Jiao Tong University's 'Academic Ranking of World Universities' ("Shanghai Index"). This ranking comprises the 500 best universities in the world and considers, among others, sub-indices on publications in journals and the number of Nobel Prize winners.

The indicators used in benchmarking are:

- The total number of scores in the Shanghai Index for all universities located in the region
- The total score from above divided by inhabitants of the region (scores per 100'000 inhabitants)
- The number of universities in the region included in the Shanghai Index

The total number of scores reflects the quantity of top research available in the region. As networking effects and economies of scale play an important role, the total number of scores is important in itself. Furthermore, in order to attract the best researchers and students possible, a region must become known as a prominent centre for learning with a critical mass of top universities. Of course, this number depends on the size of the regions as well. To take the different size of the regions in the sample into account, per capita figures are used as well. This number reflects the 'high quality research' available to every inhabitant and measures more directly the impact on per capita GDP of the innovation potential embodied in the universities. Finally, the number of universities in the regions provides information on the average score of the university – again an issue of quantity versus quality – and the networking options.

A limitation of this indicator has to be kept in mind. The focus of research of a university is a factor which strongly affects the ranking. The Shanghai Index puts more weight on the natural sciences. A university with a focus on social sciences consequently ranks lower.

A shortcoming of Edinburgh's research landscape is the missing absolute size of the top university cluster, counted in total points in the Shanghai Index or with the number of students or researchers (not shown here). As argued above, there are economies of scale especially in the transfer of academic research to applied innovations, and there are network effects in academic co-operation. The impact of these mechanisms partly depends on the relative size within the economy. But much of the gains of economies of scale and network depend on the total size of academia. In this respect, Edinburgh is in a less advantageous position. More intensive and extensive co-operation between Edinburgh's universities and other universities in the area, such as those in Glasgow, could strengthen the impact academic research has on innovation in the regional economy.

4.2 Regulation

The connections between regulation and economic performance are very complex and work through many channels of the economic system. Without going into too much detail, a more liberal system of product markets is expected to lead to a higher level of competition and a more efficient allocation of production resources. This can lead to a higher level of production as well as to dynamic effects on average growth. More flexible labour markets allow cheaper and faster adoption of the labour input when market conditions change; liberal labour markets allow the optimal use of the labour force potential. Again, level effects as well as dynamic effects are expected when labour market regulation moves towards the optimum which, for Europe, would be expected to be below the current level.

Regulation as a location factor

Regulation is a double-edged sword. On the one hand, a certain level of regulation guarantees functioning markets, corrects market failures and compensates for externalities. On the other hand, regulation is costly. Regulations need administration and oversight which consume resources not available elsewhere in the production process. Probably even more serious are the indirect costs. Regulation can lead to unwanted incentives or can hinder additional economic activities. For example, regulating certain product standards can lead to a sheltered market which reduces the incentive for companies to innovate and hinders new competitors from entering the market.

From the above discussion, it is clear that a bell shaped curve would be expected for the overall relationship between the degree of regulation and the economic performance. Economists almost unanimously believe that Europe is on the downward slope of this curve, that is, the general level of regulation in Europe is above the level optimal for economic growth. We therefore expect that, given the sample of regions used in the benchmarking exercise, it is advantageous with respect to economic prospects for a region to have a lower level of regulation.

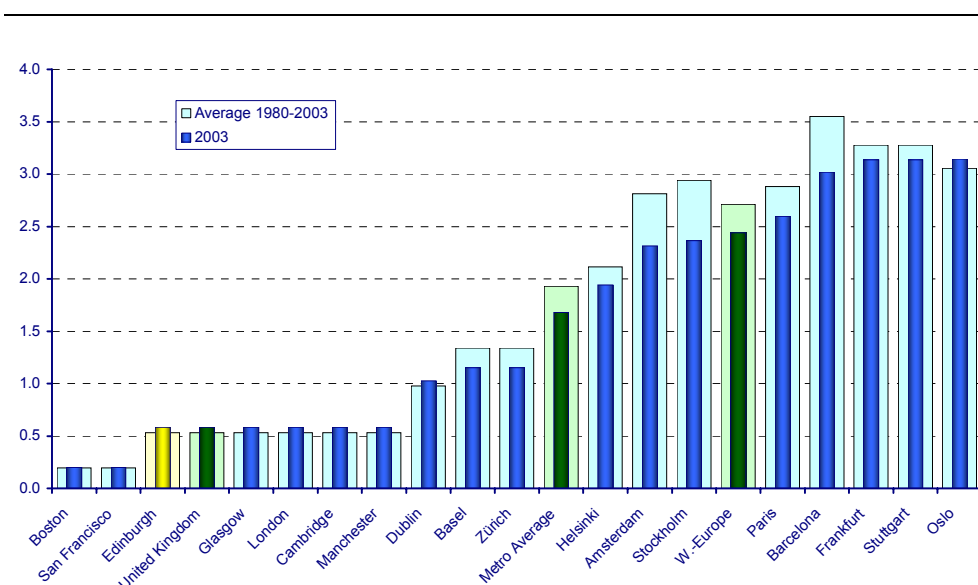
As part of the United Kingdom, Metro Edinburgh has a comparatively low level of regulation. This gives Metro Edinburgh a clear advantage against its international competitors. In general, Continental European regions and Nordic regions have more regulated markets, while other Anglo-Saxon regions outside the UK display a level of regulation similar to the UK. Indeed, liberally organised markets are a key attribute of Anglo-Saxon regions.

There is a clear gap between the labour market regulation in the Anglo-Saxon regions on the one hand and the Continental and Nordic regions on the other. The index number of just above 0.5 gives Metro Edinburgh a competitive advantage. Only the competing US regions of Boston and San Francisco achieve a lower index number. While Dublin, Basel and Zürich play in the same league each with an index around 1 for labour market regulation, the labour markets in other competing regions on the continent and in the north are much less flexible with index numbers in the range of 2 to 3. Although there has been much discussion about the inflexibility of labour markets and many initiatives tried to deregulate the

labour market, especially in Continental countries, the index numbers do not show any substantial success in 2003 compared to the averages since 1980. For Edinburgh, this is good news, at least in a static sense. If its competitors do not improve, Edinburgh can keep its advantages without any further efforts. Of course, there is also a dynamic aspect. If the continental European countries were to liberalise their labour markets, their potential for growth would improve. On the one hand, this improvement would mean Edinburgh would lose some of its comparative advantage. On the other hand, growth in Europe would result in better export chances for Edinburgh. The net effect of these dynamic mechanisms is unclear.

Fig. 33: Index of labour market regulation

0 = very liberal / 6 = very restrictive



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Regulation / OECD / The Frasier Institute

Turning back to individual regions, some regions profited from moves towards more liberal labour markets, namely Amsterdam, Stockholm and Barcelona, but the extent of these changes is of minor importance. Metro Edinburgh's comfortable position is, of course, not guaranteed for the future, but at the moment within Europe there are no substantial threats to its favourable position. Metro Edinburgh should take cognisance of its less regulated and flexible labour market when making strategic decisions.

Looking at product market regulation, Metro Edinburgh is also well positioned, but to a much lesser extent than in labour market regulation. With an index below 1, Metro Edinburgh displays, together with other UK regions, the lowest level of product market regulation, but even the competitor with the highest level, Paris, is

only slightly above 1.5 index points. Product markets in all regions in the benchmark sample can be regarded as quite liberal. This is, of course, due to the influence of the EU common market program and its success for European regions is clearly visible in the index numbers. This gets even more obvious when looking at changes that have taken place since 1980.

All regions made quite substantial progress towards less regulated product markets in the last 25 years. But the advances were larger for EU member countries. Basel, Zürich, Boston, California and Dublin show the least advances, and except for Dublin, these are the non-EU regions in the sample. A more detailed analysis shows that the UK, starting from a comparatively high level of regulation in 1980, substantially deregulated during the 1980s when no large changes could be observed in most other European countries. Only at the beginning of the nineties with the establishment of the Common Market Program of the European Union, the movement towards a single market in Europe with liberal market access rules, can substantial moves towards market liberalisation be observed in the Continental and Nordic regions.

Indicators for Regulation

To quantify the level of regulation, the OECD measures several hundred different indicators from all fields of regulation. From these, a meta-analysis yields regulation indices. Other sources following similar approaches are used to complete time series.

The indicators used in benchmarking are:

- Index of product market regulation (0 = very liberal / 6 = very restrictive)
- Index of labour market regulation (0 = very liberal / 6 = very restrictive)

For further information on these indicators see BAK (2005) as well as Conway, Janod and Nicoletti (2005), Nicoletti, Scarpetta and Boylaud (2000) and Gwartney and Lawson (2005).

All these regulation indicators are measured on a national level. This makes sense insofar as most major regulation is determined at the national level. Still, they are important in regional benchmarking to understand a region's position and its options. Without regulation an important part of the picture would be missing. Of course, there are also regulations at the regional level. Last but not least, how local officials handle a given national regulation can be very different between regions. Unfortunately, no internationally comparable data on the regional level is available. Still, the available indicators grasp the most important part of regulation and allow an international comparison of the position of different regions.

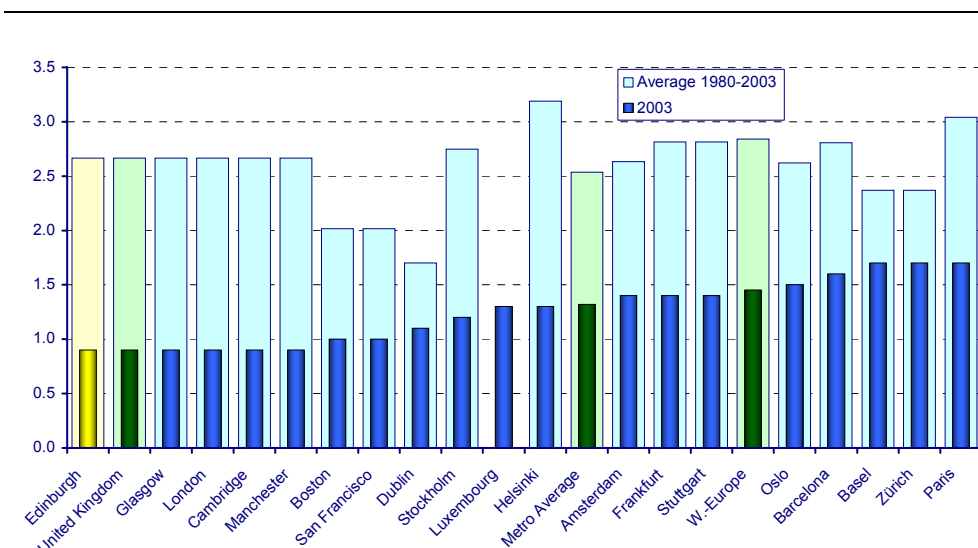
It seems that while in Anglo-Saxon regions there is a tendency in favour of a more liberal regime towards markets, Continental and Nordic regions need outside pressure to commit themselves to less restrictive regulations. While in the product market, the EU Common Market played that role, there is much less pressure on the labour market. Labour market policies in the EU are still in the national domain. That there are fewer efforts towards liberalisation without an external pressure reveals that in many countries, there is still a much more sceptical view regarding

the trust in market forces. As a result, growth enhancing liberalisation needs lots of time to be accomplished.

For Edinburgh, the combination of liberally organised markets for products as well as for labour is an asset in regional competition. A liberal regulatory system is an important factor especially for restructuring an economy and for innovative industries. In the service sector, regulation is a key aspect of capacity for innovation. For example, in the financial services sector, an overly restrictive regulation can prevent the development of new financial instruments and thereby prevent the development of completely new products and even subdivisions within the sector.

Fig. 34: Index of product market regulation

0 = very liberal / 6 = very restrictive



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Regulation / OECD / The Frasier Institute

Of course, the general level of regulation might be only one aspect for any given industry, and not the most important one. Industry specific regulations might play an important role as well. Although no specific benchmarking information is available, the obvious attitude towards more liberal market regimes in the UK is a good base for Metro Edinburgh to also achieve competitive advantages in the field of industry specific regulation.

For Metro Edinburgh, it might be advisable to make even more use of its competitive advantages over many of the other metro regions due to the low level of regulation in the UK. Given that generally regulations are set at the national level, Metro Edinburgh can only indirectly influence its development. But there are

regional and even local influences on the distortions a given regulation has on economic decisions. Often the handling of regulations by local officials or how the regulations are put into action at the local level makes a huge difference in its impact on economic development. So to focus on its advantages, Edinburgh should actively support a less stringent and more efficient handling of regulations.

4.3 Taxation

Tax competition is an issue often brought up in public discussion. Consequently, taxation and international comparisons of tax levels is high on the political agenda. Some countries follow a strategy of lowering taxes to support economic growth. Indeed, some of the new accession EU member states from Eastern/Central Europe have aggressively followed such a strategy.

Taxation as a location factor

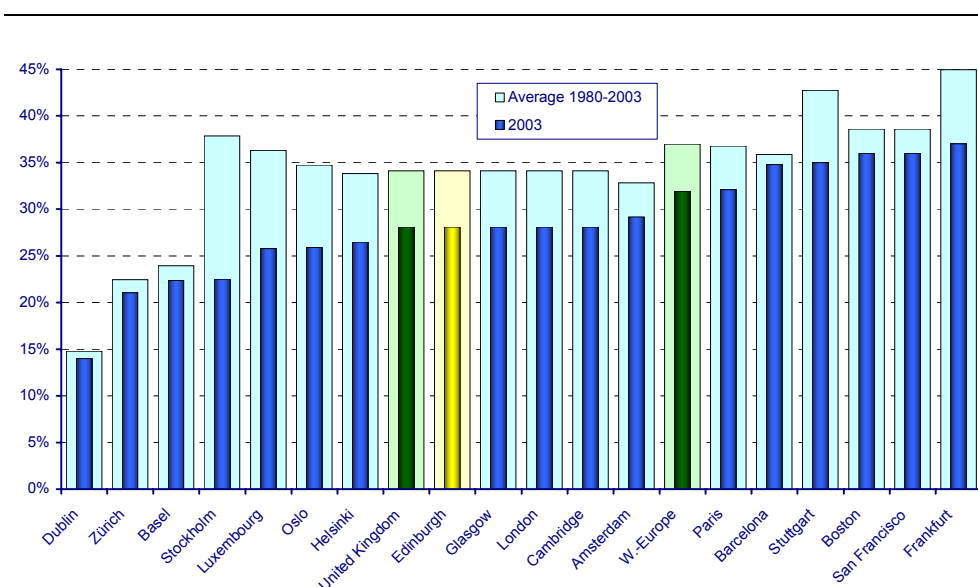
There are several ways for tax levels to influence regional economic development. Taxation is a key topic for businesses evaluating the attractiveness of a location. A lower tax burden attracts new companies to a location and provides an incentive for existing companies to stay. Even if no location decision is involved, it increases competitiveness in the market by lowering the tax costs for a company which, in turn, supports company survival or growth.

Such a connection between taxes and economic growth is obvious for direct company taxation. For personal income taxation, this is less straight forward, but for several reasons such a connection would be expected as well. First, company owners and top management have to pay personal income taxes. Their individual preferences might influence their decisions for the company. Second, employees' decisions are influenced as well. Employees focus on net available income which is different from a firm's costs. If employees have some bargaining power and are mobile between regions, the companies will be forced to bear at least part of the difference in the tax burden between competing regions. Otherwise, mobile employees will move to the regions with lower tax levels since their available income is higher there. Therefore, higher income tax levels can result in higher costs for companies. Highly qualified individuals are especially and increasingly internationally mobile. At the same time, these individuals are becoming more important for a knowledge based economy. Therefore, income taxation, especially the burden on highly qualified employees, can work as a cost factor just as much as company taxation does.

The continuous competition between regions in company taxation is visible in the data. All regions exhibit a tax burden today below the average of the last 25 years. The Nordic regions, Luxembourg and the German regions have significantly lower tax burdens for companies today. Less downward movement can be seen in Dublin, Zürich or Basel, but these regions had the lowest company tax burden in the beginning. Actually, they were so low that they are still at the top of the ranking, despite only minor tax reductions. The situation is different in Barcelona, Boston and San Francisco. There the tax burden has only fallen slightly as well, but the starting level was much higher. As a result, they are in the group of regions with the highest tax burden.

Metro Edinburgh is positioned in the middle of the ranking for the current tax burden as well as for the average level 1980 to 2004. Company taxation is probably not the main reason a company would come to – or stay in – Metro Edinburgh. On the other hand, with its position in the middle of the ranking, company taxation keeps only a small minority of companies that are extremely (tax-) cost sensitive from locating in Metro Edinburgh. For these very cost and tax sensitive companies, Metro Edinburgh will probably never be the location of choice anyway, as it is a high wage region in a globalised world. There is therefore not a great deal of advantage for a region with an economy like Metro Edinburgh's to compete for companies by lowering the tax burden to the lowest level among all its competitors. For Metro Edinburgh, a good mix of framework conditions and other location factors are needed to be attractive as a business location. To achieve this, resources are necessary, e.g. for building infrastructure or education. Taxes are a way to gain such resources, and as long as the tax levels are not extraordinarily high, companies and individuals are willing to pay for a good quality location. As long as company taxation is not an extraordinary burden compared to competing regions, this is not a disadvantage for Metro Edinburgh.

Fig. 35: IBC Taxation Index – Companies



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

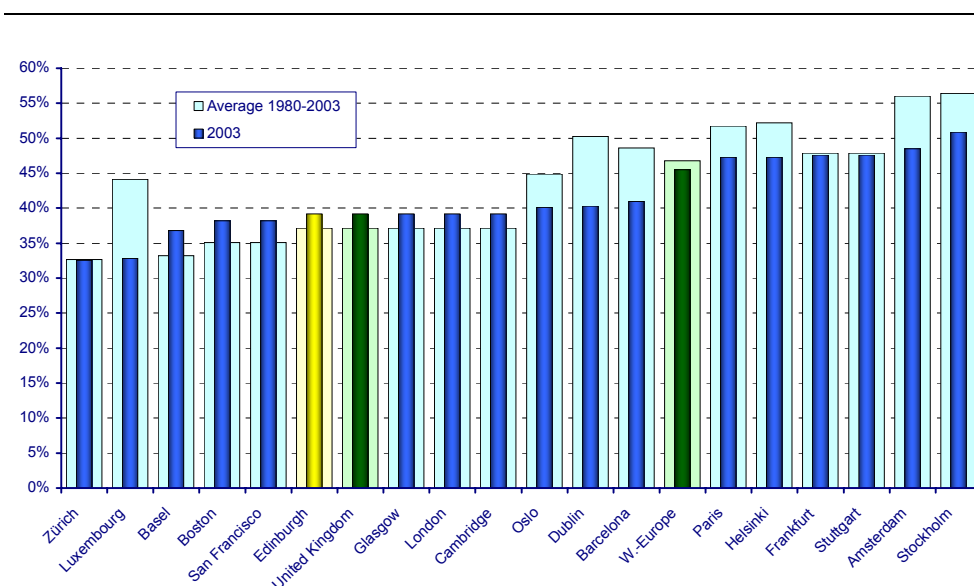
Source: BAK Basel Economics – IBC Module Taxation

Of course, while no action currently seems necessary, international developments on company taxation should be monitored. For the location decision of firms, the relative burden is more important than the absolute burden. If there are movements

in other regions, the position of Edinburgh could detrimentally change and future action might be required.

Another issue important for regional development is the attractiveness of the region to highly educated labour. In an economy increasingly based on knowledge and with growing international competition with low cost regions, Western European regions depend upon high value added workplaces and continuous innovation. Although much less discussed as a factor in international competition between regions, one aspect of attractiveness is the tax burden for highly qualified employees. It is also an issue for companies. Apart from the availability of the necessary human capital, it can also influence the employment costs for a company (see box).

Fig. 36: IBC Taxation Index – Highly Qualified Manpower



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Taxation

Metro Edinburgh is quite well positioned regarding the income tax burden on highly qualified employees. Only five regions, Zürich, Basel, Luxembourg, Boston and San Francisco, have lower taxes. Most continental regions, as well as the Nordic regions, tax highly qualified employees more. It can be clearly seen in the data that income taxation is less of an issue in the debate around international competition between regions. The changes observed are smaller than in company taxation, and they have no clear direction. If anything, it seems that the income tax burden on highly qualified employees is becoming more uniform across regions.

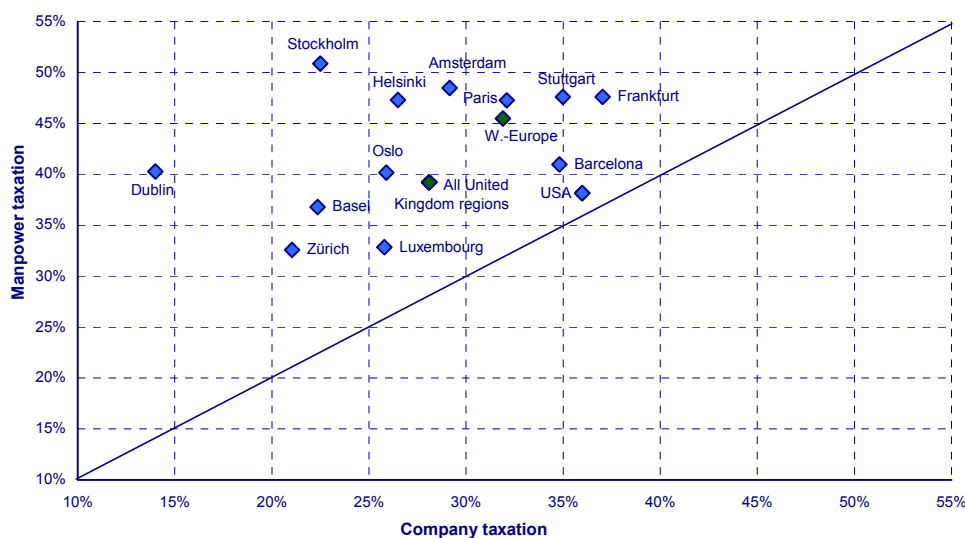
It is interesting to set these observations in relation to some recent research results on the influence of taxation on the economic performance of regions. Not surprisingly, econometric analysis confirms that a higher tax burden – regardless of the kind of taxation – lowers economic growth¹⁹. However, it is estimated that the tax burden on highly qualified labour has a stronger impact on economic growth than the tax burden on companies. Furthermore, of all policy-influenced location factors available for research, taxation contributes the most to explaining the differing productivity growth experiences in regions.

The relevance of the income tax level is an important observation and relevant to policy-making. Policy tends to concentrate on company taxation as the means to foster economic growth. But the results suggest that it might be worthwhile to look more closely at the income taxation on highly qualified labour. This conclusion is supported by theoretical considerations as well as the behaviour of highly qualified persons observed in everyday life.

Although the two indicators for company taxation and income taxation of highly qualified employees can not be directly compared due to different methodologies, it is still interesting to plot them against each other to observe the relative relationships. From the graph, it is clear that one source of tax does not substitute for the other source. If there is any correlation between the level of income taxation and of company taxation, it is positive. That means a higher tax burden on companies goes along with a higher tax burden on highly qualified individuals as part of an overall high level of direct taxes.

A prominent exception to this observation is Dublin. The data clearly reflects a strategy of low company taxation. Ireland relies on attracting foreign capital and offering low company taxes is one method to do so. To some extent, the opposite strategy is followed by Boston, California and Luxemburg. Human capital is of crucial importance to maintain their lead in technological progress or in financial services development. Consequently, they have a low level of taxation on highly qualified persons. All these regions have been very successful with their strategies. This clearly shows that it is not necessary to lead in all kinds of location factors at the same time, but rather, to find an individual mix best suited to the given conditions and strategic goals. Indeed, it is probably not advisable to try leading in all location factors as conflicting objectives will make this impossible.

¹⁹ See Eichler, Blöchliger, Grass and Ott (2006). This study focuses on productivity growth, but an earlier study (Eichler and Grass 2004) as well as preliminary results from this ongoing research program show that the general conclusion for economic growth is not different. As most other studies are not able to discriminate between different kinds of taxes, they can neither support nor contradict the finding that manpower taxation is more important for the regional economic development than direct company taxation. But the general negative impact of taxation on economic development is supported by other studies (see e.g. Bassanini and Scarpetta 2001, Bleaney, Gemmell and Kneller 2001).

Fig. 37: IBC Taxation Index – Companies and Highly Qualified Manpower

Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Taxation

Indicators for Taxation

Taxation is a large field of research and many indicators are available. The choice gets much more limited when the data should be internationally comparable, reflect the complete tax system instead of only one particular issue or tax rate, and fit the economic reasoning given above. We have two indicators fulfilling these conditions, one for company taxation and one for the tax burden on highly qualified employees.

The indicators used in benchmarking are:

- Company tax burden (in percentage-points of profits)
It measures the Effective Average Tax Rate including all kinds of direct company taxes for a typical profitable investment.
- Tax burden on a highly qualified employee (in percentage-points of gross income)
It measures the Average Tax Rate for a highly qualified employee (available income after taxes: 100'000 EURO; single). Taxes include the expected tax burden on pensions and social security contributions if mandatory and appropriate (has a tax characteristic).

For further information on these indicators, see BAK (2005) as well as Elschner and Schwager (2003) and Elschner and Overesch (2004).

As in the case of regulation, taxation is an issue defined on the national level to a large extent. But again, it is important to regions' prospects for growth. Therefore, it should be included in an international benchmarking. Furthermore, depending on the national setting, there are possibilities for regions to increase or decrease the tax burden, in many countries at least to some extent, in some countries to a large extent (e.g. Switzerland, USA). The indicators used take regional differences into account if appropriate.

Taxation is a key topic for businesses evaluating the attractiveness of a location. In view of intensive international competition for capital, and hence for workplaces, the tax burden on companies is one of the most important policy location factors. Fortunately for Metro Edinburgh, the tax burden it levies is significantly below the average burden. Metro Edinburgh is not an explicitly low tax region, but it is in line with competing regions, if not somewhat better. The tax burden is not too large and does not create a substantial disadvantage. It does not outweigh other framework conditions and location factors playing in Metro Edinburgh's favour. Competing for companies with an explicit low cost strategy of lowering taxes substantially below competitors would not be a sustainable strategy for a high wage region like Metro Edinburgh anyway. Of course, as taxes change internationally, the position of Metro Edinburgh could deteriorate in the future. The developments in competing regions should be closely monitored on a regular basis to make sure Metro Edinburgh is able to react to new developments in a timely manner.

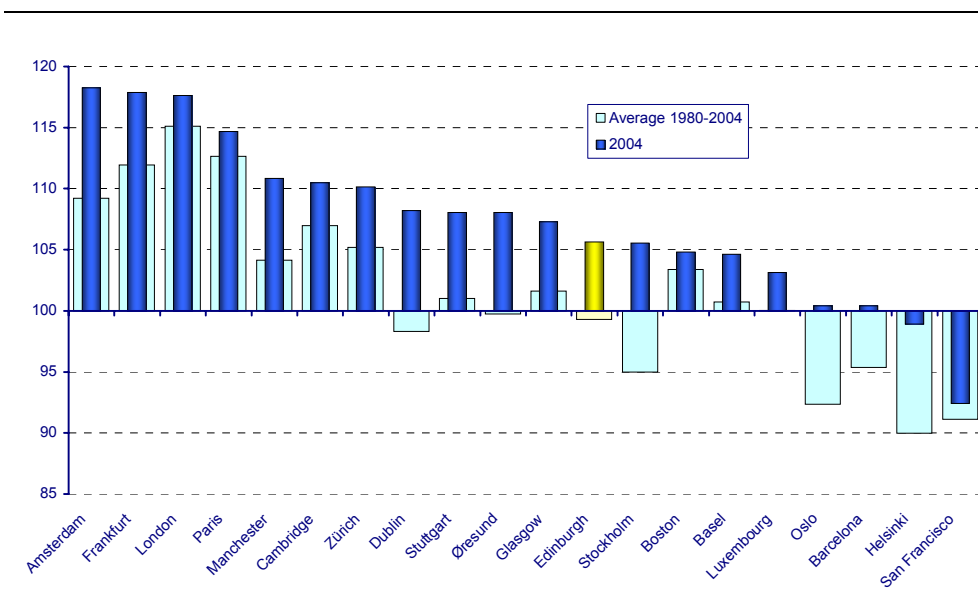
4.4 Accessibility

The accessibility of a region is driven by two factors: geography and infrastructure. While the geographic position cannot be changed – and Edinburgh with its position at the periphery of Europe is disadvantaged in this respect – improving connectivity is a key policy aim.

Accessibility as a location factor

A region's accessibility is a key factor in a globalised economy. Today, all regions in Western Europe are accessible, but the degree and efficiency of accessibility vary. Without good accessibility, a region can not profit from the international division of labour to the same extent as other regions and is less attractive for companies.

For a region's global accessibility, or how well a region connects with the rest of the world, geographical location is less important than its connections to one of the large world airports. Not surprisingly, Amsterdam, Frankfurt, London and Paris clearly lead the ranking. Amsterdam, and to a lesser extent, Frankfurt were able to improve substantially in recent years while Paris and London only made small improvements. Metro Edinburgh, with London as its closest major hub, would be expected to do comparatively well so its position in the second half of the sample of competing regions is somewhat disappointing. Not surprisingly, UK regions closer to London do better. Some metropolitan regions like Zürich and Dublin from smaller countries do better as well. For Edinburgh to improve its global accessibility, it would need to improve its connections to global airports, especially those in London. Interestingly, Glasgow has a better performance than Edinburgh and this demonstrates the potential to improve.

Fig. 38: Global accessibility

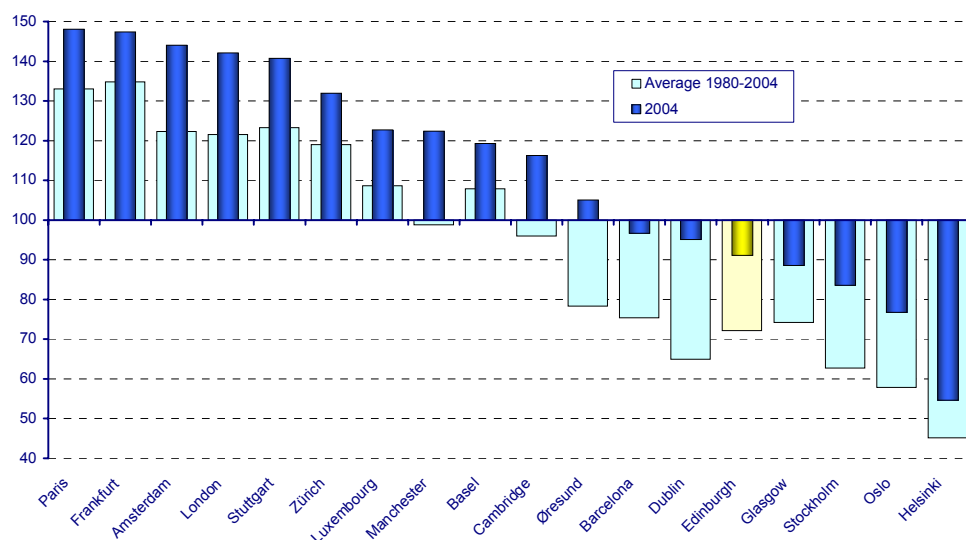
Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Accessibility

The Nordic regions are worse off than Edinburgh. They face the double disadvantage of geography and not having a world hub within the larger geographical area. Finally, Boston and San Francisco perform poorly in global accessibility though this result should not be overvalued since the indicator is not completely comparable for regions from different continents²⁰.

For continental accessibility, the accessibility to other European regions, Edinburgh is again positioned in the lower part of the ranking distribution. Here, its geographical position at the periphery of the continent plays a dominant role. The other regions on the periphery of the continent, including the Nordic regions, Barcelona, Dublin and Glasgow, are all positioned towards the end of the ranking. The top positions are occupied by cities in or close to the economic centre of the European market dominated by the pentagon London-Paris-Frankfurt-Ruhrgebiet-Randstad. The whole European banana, as the pentagon plus the area along the Rhine valley between Southern Germany and Northern Italy is sometimes called, is in the top half of the table. A good connection to a big hub helps, but the position within Europe is indeed defined by geography.

²⁰ The intercontinental accessibility measures the accessibility to regions of the world outside the home continent of the region. Therefore, for North American regions the total GDP which can potentially be reached – the indicator used for weighting in the accessibility index – is different from the potential which could be reached for European regions.

Fig. 39: European accessibility

Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics – IBC Module Accessibility

Indicators for Accessibility

Accessibility is not one clear concept; rather many different things can be subsumed within the topic accessibility. Here a concept of outbound accessibility is followed, taking into account travel times and frequencies to reach other regions. The indicator reflects the complete potential, therefore including all other regions without any time limitation. But it weights the destinations regarding the travel time (with a non-linear function) and the GDP of the destination.

The indicators used in benchmarking are:

- Global accessibility (index, sample average 2002=100²¹)
It reflects the outbound accessibility from a region to locations in the rest of the world outside Europe.
- Continental accessibility (index, sample average 2002=100)
It reflects the outbound accessibility from a region to all other regions in Europe.

For further information on these indicators see BAK (2005b).

These two indicators cover what are usually considered the most important aspects of accessibility that influence a company's location decision. It does not cover accessibility within the region, e.g. regional road networks and the quality of public transport. This will especially influence the location decisions of companies within the region, but it is also a factor of attractiveness for the region. For example, long commuting times will make a region less attractive for employees which, in turn, might make it difficult or more costly for a company to recruit the necessary labour.

²¹ The available sample in 2002 consisted of a different set of regions, focused on regions from the alpine space. The comparability of the numbers is not hampered by the index base being drawn from different regional sample.

The accessibility of Metro Edinburgh is not particularly well developed when taken in a European context, partly due to its geographical location. Good air transportation is crucial to Metro Edinburgh's connectivity. Even with improvements to air transport, Metro Edinburgh will not become a top accessible metropolitan region in Europe in the foreseeable future. The strategies for Metro Edinburgh's economic development should not focus on industries which are heavily dependent upon easy and direct travel options for their employees or customers, e.g. the European head offices of consulting firms. This does not mean that improving the accessibility should be ignored. In modern economies, just about all industries rely on trade, division of labour and access to larger markets for supplies and products. Therefore, infrastructural improvements should be focused to ensure that, in terms of accessibility, Metro Edinburgh is not at a substantial disadvantage compared to its competitors, even if attracting industries demanding top connections is not on the strategic agenda.

4.5 Labour Costs

A final issue relevant to companies' location decisions to be discussed here is the cost of labour. The level of costs per hour worked in the City of Edinburgh is slightly above the Western European average²². This is a fairly good position considering that the Western European average includes typically less expensive rural areas whereas Edinburgh is an urban area. Unfortunately, international data on labour costs at the regional level is still scattered and therefore no benchmarking against the sample of other metropolitan regions is possible.

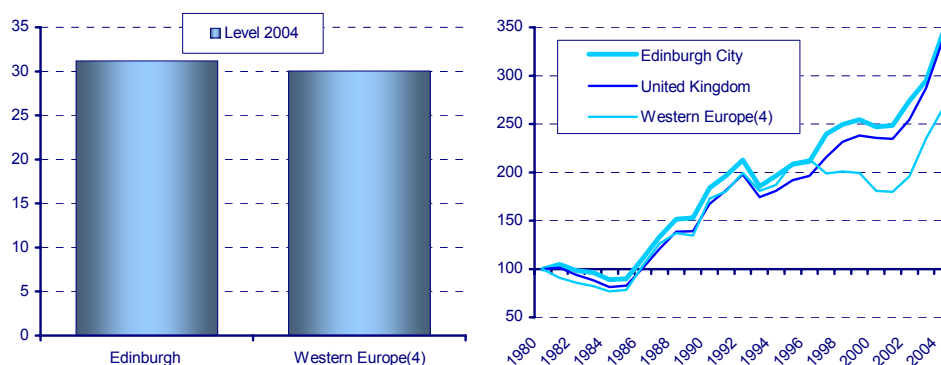
Although the level of labour costs in the City of Edinburgh is competitive in a Western European environment, it lost ground in recent years. Labour costs in Edinburgh roughly doubled between 1980 and 1997. Although a substantial increase, this was pretty much in line with UK and Western European developments. However, since 1997, the labour costs in Edinburgh have risen much faster than the Western European average. That the Edinburgh experience is quite similar to the UK development does not help Edinburgh's position in international competition. While the Western European average labour costs in 2004 were about 30 percent higher than the 1997 level, in the City of Edinburgh, the increase amounted to 75 percent. Combining both observations, the equal level of labour costs in Edinburgh and Western Europe in 2004 and the stronger growth of labour costs since the mid nineties in Edinburgh, leads to the conclusion that up until the mid or late nineties, Edinburgh had the advantage of lower labour costs compared to the Western European average. This advantage subsequently disappeared. As a consequence, Edinburgh can not rely on a cost advantage against European competitors anymore. This once more points out the importance

²² Labour costs are only available for the City of Edinburgh. It could be expected that the dynamics are similar for the Metro region, although the level might be somewhat lower.

of increasing productivity and growth by shifting towards a knowledge based economy.

Fig. 40: Labour cost per hour

Level 2004 in USD and evolution 1980-2004 (Index 1980 = 100)



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

4.6 Conclusions

Benchmarking the location quality of Metro Edinburgh paints a picture of a region with many advantages and some disadvantages. There is a high quality and quantity of resources necessary for innovation. The labour force is well qualified. Edinburgh is also an attractive place to live and work for highly qualified people, as the strong increase in the share of the labour force with higher education shows. Apart from the fact that there are a large number of institutions providing higher and further education, Edinburgh possesses world class universities. Relative to the size of the region, it scores amongst the best regions in academic ranking. Even without taking size into account, Edinburgh performs well although the academic sector might lack some economies of scale and scope due to the limitations in absolute size. On the down side less monetary resources are put directly into research and development (R&D) and most other regions score better. Metro Edinburgh, which has a substantial share of its economy in the producing sector and which has the strategic goal to grow in some of these industries, should be aware that without substantial efforts in R&D, it will be difficult to gain sustainable producing industries in a high wage setting of a Western economy.

In a second set of location factors, Edinburgh profits from being part of the UK. Labour and product markets are comparatively liberal in the UK, and the tax burdens are lower than on average in a Western European setting. Particularly in

labour market regulation and taxation of highly qualified individuals, Edinburgh enjoys comparative advantages against its competitors from the continent (including the Nordic regions). Edinburgh should be aware that this position relative to its competitors could weaken in the future. Indeed, with respect to product market regulation and company taxation, Edinburgh's position relative to its competitors has already somewhat deteriorated. A similar picture emerges for labour costs. Edinburgh had quite an advantage over the Western European average, but since the end of the nineties, it has lost some ground.

Summing up, Metro Edinburgh should not rely too much on UK advantages as this favourable position is not guaranteed for the future. Because there is less room for the UK to react on the issues in question than for regions from the continent, the relative advantage of Edinburgh will most probably lessen compared to international competitors. Metro Edinburgh should be aware of this and should prepare to focus on its other advantages in the future. Advantages could be created through an innovation push. Here, the basic resources are available, but Metro Edinburgh has not been able to sufficiently capitalise on them. On the other hand, there are some indications that this might be changing. Since around the year 2000, there has been observable improvement in both productivity and the exploitation of density within the centre of the metropolitan region. Both issues are also closely related to the knowledge driven economy and continuous innovation. It seems that Metro Edinburgh is already moving in the right direction and it should keep going.

5 Industrial Clusters: Options for Edinburgh's Economic Development?

Three industries are of special importance to Edinburgh and its future prospects for economic development: the Financial Sector, Life Sciences, and Tourism. These industries are well represented in Metro Edinburgh, depend heavily on location factors Metro Edinburgh is strong in, and/or offer high growth and value added potential for the future.

Therefore, a more thorough analysis of these industries is essential in a discussion of development options for Edinburgh. Although we will not go into the most detailed analysis possible for each individual industry, we will provide a lot of specific information while staying within the framework of a general benchmarking exercise.

5.1 The Financial Sector

5.1.1 The Financial Sector in Edinburgh

The financial sector is of great importance to Metropolitan Edinburgh. In 2004, it contributed 12.6 percent of the local economy's real gross value added. The sector has performed outstandingly well during recent years. An enormous number of well paid jobs have been created, stimulating the local economy and generating a higher tax income for the region. Edinburgh has a strong history of banking and insurance, hosting some of the world's top financial corporations' headquarters. In order to retain these important companies and to attract new businesses from the financial sector, it is very important to recognise the key drivers of their successful development.

Of all the location factors regulation is the most important issue for the financial sector. Worldwide capital markets are being liberalised. Deregulation of the services sector in general is near the top of the political agenda. Liberalisation leads to a higher mobility of capital and to increasing competition between banks and between regions. If a region is not willing to offer a favourable financial environment, it may fall behind very quickly. Within the UK, regulatory environment is generally very positive for the banking industry, but there is still room for improvement. Therefore, a more detailed analysis of the regulatory landscape

would be very helpful to identify further areas of possible improvement, especially on a regional basis²³.

Financial institutions are perceived differently by their clients nowadays. They cannot rely solely on the personal and emotional relationship built up with their clients anymore. Bank products are today considered like commodities – one perfectly substitutable for another. The quality and cost of services that a bank can offer is now what counts most. This further enhances competition between banks. Cost efficiency becomes a very important factor in banks' strategies. Mergers and employment reduction may follow such trends.

5.1.2 Structure of the financial sector

To fully understand the contribution made by the financial sector we need to look at the sector's contribution to the regional and city economies. In Metro Edinburgh, the sector contributes some 12.6% of the regional economy's real gross value added: 8.3 percent stems from banking, 3.8 percent from insurance and the remaining 0.5 percent from other activities related to banking and insurance. Considering only the City of Edinburgh (without its agglomeration), the share of real gross value added by the financial sector reaches 15.2 percent. This share is much higher than the UK average share of 8.5 percent and the share in Metropolitan Glasgow of 6.6 percent. Even though growing rapidly, the share of Edinburgh's financial sector in the local economy is still much smaller than in classic financial locations like Zürich (29.3%), Luxembourg (28.6%) and London (17.2%). In total size, Edinburgh's financial sector is still among the smaller players in this report's sample regions, regardless which of the regional concepts, City or Metro region is used. For the larger Metro region, measured by its size of gross value added (on a US Dollar purchasing power parity basis), it is sandwiched between the slightly larger regions of Helsinki, Greater Manchester and Basel and the slightly smaller regions of Stockholm, Øresund, Stuttgart and Dublin.

The financial sector is itself composed of several parts which could be separated for a detailed analysis, e.g. retail banking, investment banking, real estate

²³ Regulation of a financial system covers financial institutions and financial markets. Regulation of financial institutions aims to provide system stability and security (e.g. license requirements, government ownership, deposit insurance, etc.). The core objective of financial markets regulation is investor protection defined in a broader sense (e.g. security exchange rules, company law, bankruptcy law, adequate court procedures, market transparency, etc.). The regulation guarantees a functioning market and a trustworthy environment on the one hand. On the other hand it usually poses barriers to competition and increases the administrative cost for market participants. The adequate level of regulation has to be identified and regulation should be implemented as efficient as possible.

The regulation takes place on a national and on a regional level. It would be particularly interesting to identify the regional aspects of regulation, measure them in an international comparable way, consider their adequacy and find possible improvements.

financing, financial intermediation, fund management, life insurance, pension funding, non-life insurance, etc. The “International Standard Industrial Classification” (ISIC or NACE-code) does not go quite that far, but it does split the financial sector into the following three categories:

- 65 - Financial intermediation, except insurance and pension funding
- 66 - Insurance and pension funding, except compulsory social security
- 67 - Activities auxiliary to financial intermediation

This classification is the basis of most national accounts statistics. Such statistics are very useful to form a first impression of the financial sector, but they are too general to paint the whole picture. It would be enormously interesting to do more detailed research and to further break down the analysis. This would allow for a detailed analysis of such important businesses as financial intermediation, fund management, life insurance, pension funding, non-life insurance, etc. Such a detailed analysis is beyond the scope of this benchmark report.

The analysis in the following sections will concentrate in more detail in the ISIC classes 65 and 66 which have seen very different developments in the last ten years. For simplicity, they will be called banking and insurance.

5.1.3 The Banking Industry

There are very different ways to measure the performance of the banking industry. As in other industries, one can measure the growth in gross value added. However, for the service sector and for banking specifically, this figure is difficult to interpret. Other important measures for economic growth are employment or working volume and productivity. Apart from these more general figures, there are other banking specific measures which can be considered. Assets under management is the key figure for the banking industry. Net new assets under management is a very important indicator for the capability of banks to acquire new capital from new or existing clients. On a company level, these figures are regularly published. But even there double counting occurs. When it comes to locating assets under management on a regional basis, things become more complicated. It is difficult to locate where an asset is actually managed and, therefore, where it should be counted. To make things worse, different definitions of assets under management are used.

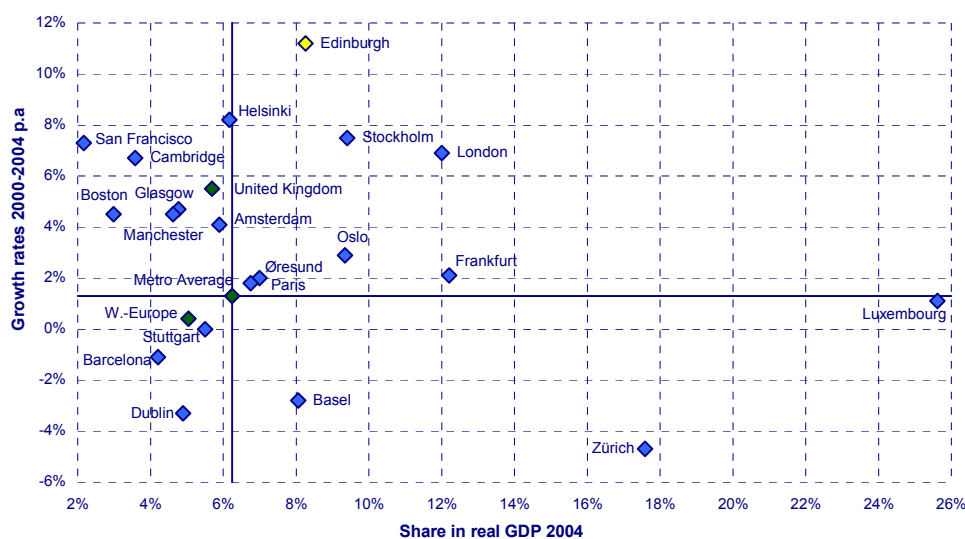
There is a vast amount of research covering the banking industry on a company or on a country level. On a regional level, very little data is available and consequently its analysis poses a great challenge. BAK Basel Economics has a strong focus on the regional view and is therefore capable of analysing some of the key indicators at that level. BAK Basel's extensive database shows record breaking results for

Edinburgh's banking industry. The data suggests that Metro Edinburgh – of course with a strong focus within the City of Edinburgh – managed to establish itself as the number two banking location in the UK after London. Measured on a nominal gross value added basis 2004, Metropolitan Edinburgh's banking sector added £1.2 billion, while London added £11.6 billion of value. The success of some major banks headquartered in Edinburgh has of course helped it to reach this second rank, but there must be more reasons to fully explain it.

As the graph shows, real gross value added of banking has seen the fastest growth of all the peer regions in this report over the time period 2000-2004. The annual average growth rate was 11.2 percent and was followed by Helsinki, Stockholm and San Francisco with 8.2 per cent, 7.5 per cent and 7.3 percent growth respectively. London ranks only fifth with a growth rate of 6.9 percent per annum.

Fig. 41: Growth contribution of Banking 2000 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

The share of gross value added by the banking industry to the local economy's gross domestic product amounts to 8.3 percent. This is well above the Metro Average of 6.2 percent and shows the great importance of the industry for the regions' economic development.

Metro Edinburgh's banking industry displayed the strongest employment growth in the regional sample of this report over the past nine years. Employment grew by 50 percent between 1995 and 2004. This positive trend was most notable in the later years 2000 to 2004. In that period, the average annual employment growth rate of the banking industry amounted to 8.7 percent. Evidently the industry has played a very important role in Metro Edinburgh's recent employment growth, nearly a third of the new jobs created within Metropolitan Edinburgh stem from banking. That is a very welcome development. The jobs created within the financial sector usually require a high level of qualification, are very productive and often pay high salaries. This, in turn, stimulates the local demand for goods and services in general. On the other hand, it poses a great challenge to the local economy. It has to adapt to the structural changes in progress, especially on an educational level. The new demand for highly qualified employees must be satisfied.

The record results during the 2000 to 2004 period are even more remarkable considering the difficult international background characterised by, most importantly, the volatility of the stock markets following the burst of the dotcom bubble, and deteriorated even further following various corporate scandals and the threat of terrorism and war. Interestingly enough, the banks in Edinburgh performed quite well at the same time that stock markets performed worst. The banking business in Edinburgh probably profited from its lower share in investment banking compared to London. Investment banking is the division that usually suffers the most when stock markets perform poorly.

As for the year 2004, nominal hourly productivity of the banking industry is clearly higher in Metropolitan Edinburgh (31.5 £/hour) than in the UK average (21.6 £/hour). Ten years ago, London's financial sector had a relatively low productivity but managed to catch up to 28.7 £/hour in 2004 – nearly as productive as Metro Edinburgh! Metropolitan Glasgow lies far behind with only 14.2 £/hour.

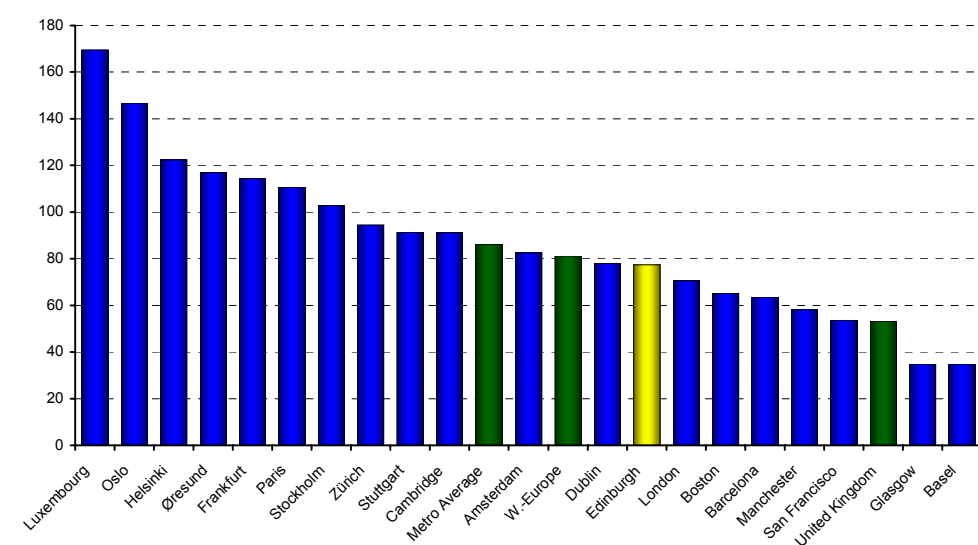
Metropolitan Edinburgh's banking productivity growth was strong in the period 1995-2000 with an average annual growth rate of 4.9 percent, but slowed down a bit to 3.1 percent in the period 2000-2004. For London, the converse can be observed. Between 1995 and 2000, its productivity grew on average by only 3.5 percent annually, but between 2000 and 2004, it grew by 9.5 percent annually. London has nearly closed the productivity gap and might soon take over as the most productive region. Therefore, a close eye should be kept on sustaining Metro Edinburgh's high productivity growth within the sector.

A possible explanation for the different patterns observed in Edinburgh and London could be their respective stages within the industry's investment cycle. Generally, a reduction in employment within an industry should be followed by higher productivity. This in turn should lead to a better competitive position and attract new business. A phase of expansion should follow and employment should

increase again, lowering productivity a bit. Both London's and Edinburgh's financial sectors saw a decrease in working volume and a rise in productivity towards the end of the last century. Then they both entered into a phase of expansion which in London ended abruptly with the stock market's poor performance, but which seems to have continued in Edinburgh. The dynamic development of the industry with ongoing growth and continuing investment shows its very strong position and solid future prospects. The temporary slow down in Edinburgh's banking industry's productivity might be a side effect of this continuing expansion.

Fig. 42: Productivity in the Banking Industry 2004

real hourly productivity, USD, 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

As the graph shows, on an international level, productivity of the banking industry of Edinburgh and that of the UK banking industry in general is below the Metropolitan Average. In order to provide good comparability between regions, we measure real productivity on a US Dollar purchasing power parity basis. The results above are very interesting because they differ greatly from what was observed for the regional economy as a whole. Take San Francisco as an example: It ranks first in the comparison of regional economic productivity, but second to last if only its banking sector is considered. To some extent, the differences in the banking industries' productivity might be explained by their different focuses. Well performing regions from the sample have a strong leg in wealth management and accommodate headquarter functions. This might suggest

that there is a productivity effect caused by the composition of a regional banking industry.

5.1.4 Success factors of Edinburgh's Banking Industry

The available data allows a preliminary analysis of some of the factors of Edinburgh's success. As pointed out above, regulation is a very important factor for financial centres to prosper and the regulatory environment, established at the national level, works in Edinburgh's favour.

For financial centres to prosper a "critical mass" is needed. Empirical evidence shows that financial centres of a certain size tend to act as a magnet attracting more and more business. This concentration process has led to the emergence of a few, very big financial centres while the smaller ones have continued to lose importance. The reasons for the emergence of such giant financial centres are yet unknown. In other industries, life science for example, the formation of big clusters is a very common phenomenon. Some advantages are obvious. Closeness to research facilities stimulates the development of new products. Economies of scale lead to a reduction of costs. A big labour market facilitates recruitment of talented employees. A competitive environment stimulates constant progress. But can the same arguments really be used to explain the formation of clusters in banking?

Sufficient supply of highly qualified labour is of utmost importance to banking. As banking products are becoming more complex all the time, banks need employees that can cope with these new complexities. In 2003, Edinburgh City had a 37 percent share of employees with tertiary education. London had one of 45 percent and the UK-average was 32 percent. The results from the Shanghai index of the 500 best universities in the world draw a similar picture: Metropolitan Edinburgh managed to significantly improve its total score from 36 in 2003 to 48 in 2004. These are good results and can probably be attributed to the success of some recent political initiatives.

Another way to satisfy the local demand for highly qualified labour is to attract qualified professionals from other regions. Therefore, it is important to offer an attractive living environment characterised by reasonable taxation on high incomes and a good quality of life. Where the latter is concerned, Edinburgh has some great advantages to offer in comparison to London: Less congestion, more affordable housing and a less stressful working environment. Apart from being important for peoples' residential decisions, these factors might also be important for companies' location decisions. Further research would be needed to assess these factors in more detail.

In UK terms, Edinburgh has other significant advantages to offer in comparison with the big financial centre London: Lower labour costs and lower office rents. BAK Basel Economics estimates the labour costs within the banking sector to be around 20 percent lower in Edinburgh than in London. Office rents should be well below those in London as well. These two factors boast considerable cost saving potential in comparison with London and make Edinburgh very attractive for the financial sector. Edinburgh could position itself as London's 'little brother' in the finance world thus profiting from the image and size of the UK banking industry and offering more favourable conditions for companies and employees.

5.1.5 The Insurance Industry

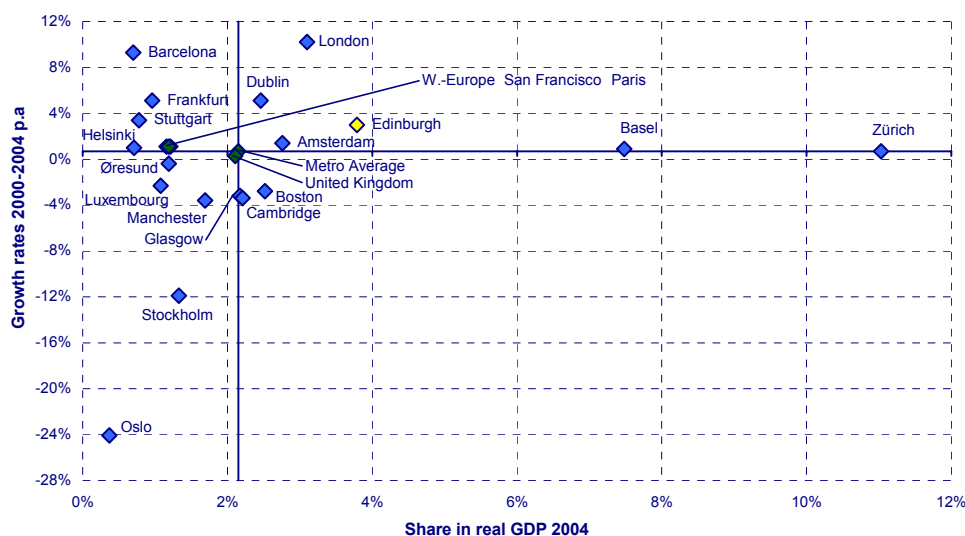
For the insurance business, the picture looks mixed in Metropolitan Edinburgh. A very strong start of the millennium with a solid increase of gross value added, employment and working volume was followed by two weaker years in 2002 and 2003, accompanying the weak performance of stock markets. In fact, the worldwide insurance industry performed poorly during these two years because insurance companies are heavily exposed to fluctuations in the stock markets. Even with these ups and downs, against the international comparators Metropolitan Edinburgh's insurance industry performed rather well between 2000 and 2004. Real gross value added by the insurance industry grew with an annual average growth rate of 3 percent.

As the graph shows, the insurance industry of the Metropolitan Region of Edinburgh is well positioned in comparison with regions outside the British Isles (including Ireland). It lies well above the average of Metropolitan Regions. Only Cataluña, Frankfurt and Stuttgart saw stronger growth in the period 2000-2004 and only Basel and Zürich had a higher share of the insurance business gross value added to the local economy in 2004. This definitely reflects the long and proud history of insurance business in Edinburgh.

The situation looks less favourable among the British Isles (including Ireland) themselves. The insurance industry experienced an enormous growth of 10.2 percent in London and a solid growth of 5.1 percent in Dublin. This might in part be the consequence of a restructuring process following some large takeovers of insurance companies formerly based in Edinburgh. As the chart shows, insurance contributes a large share to Metro Edinburgh's regional gross domestic product – the highest of its national peers within this sample. But there seems to be a realistic threat of losing ground to London (if it continues its phenomenal growth).

Fig. 43: Growth contribution of Insurance 2000 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
Reading example: See note on Figure 22.

Source: BAK Basel Economics

5.1.6 Conclusion: Perspectives for Financial Services

Banking is a huge success story for Metro Edinburgh. Over the last ten years, and especially since 2000, banking experienced an extraordinary increase in jobs and output. Furthermore, some indications can be found in the data that Edinburgh's banking institutions will stay on a strong growth path in the future. Although not as dynamic as banking, the insurance industry of the Metropolitan Region of Edinburgh is also well positioned.

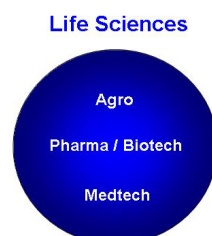
As long as location factors for financial services stay favourable, there are no signs that the success story could suddenly end. Regulation is a very important factor for financial centres to prosper. An issue more in the influence of regional policy is the sufficient supply of highly qualified labour. Being attractive as a region to live and work is an important element to any future strategy if the financial sector is to attract and retain highly qualified people. Without such people the growth potential will be limited. Finally, "critical mass" is needed in the financial services. In particular the close inter-relationship between the City of Edinburgh and the City of London is an important asset to build on given London's status as a global financial centre.

5.2 The Life Science Industry

5.2.1 Definition and characterisation of the Life Science Industry

Strong growth, above-average productivity, job creation: the life sciences industry has clearly demonstrated its worldwide potential in recent years and the sector is expected to strongly contribute to economic development and productivity growth in the future. The life sciences industry should be seen as a key sector of the 21st century. To avoid entering into international cost competition with lower wage countries, many Western European and North American regions prefer to focus on high-productivity industries such as life sciences. Many regions are jumping aboard the life sciences high-speed train and are aggressively competing with each other to attract R&D dollars, talent and new companies.

As the term “life sciences” has evolved into a real buzz word reverberating throughout the industrialised world, definitions of what life sciences actually are have also proliferated. The life sciences industry is certainly much broader than the individual industries listed in most sets of official economic statistics. Based on discussions with experts in the field and on the consolidated definition in several former studies on the life sciences industry in the US, BAK Basel Economics defines the life sciences industry as the grand total of the sectors of pharmaceuticals, agricultural chemicals, medical engineering, and an estimation of research & development conducted in life sciences. The life sciences industry represents a catch-all industry and constitutes an important pillar on which the technological development of the whole industrial sector rests.



A characteristic of the life sciences industry is its geographical concentration in regional clusters. These clusters consist of competing, cooperating and interdependent networks of various life sciences businesses (including component suppliers, sub-contractors, specialised service providers, as well as organisations such as universities, institutions, and associations). Regions able to attract and foster this kind of clustering must have certain especially advantageous location factors. But what are these factors that influence and determine the performance and prospects of the life sciences industry?

The life sciences industry is already strongly concentrated. This means it might not be possible for all regions to develop their own life sciences clusters. Only a few of the many aspirants will succeed. Before making any great effort or investment to promote and attract life sciences businesses, a region should seriously evaluate its potential in life sciences and establish a strengths and weaknesses profile.

5.2.2 Monitoring the Life Science Industry

In order to explore the driving forces behind the life sciences industry and to provide detailed information for all parties interested in the performance capabilities and framework conditions of the life sciences industry, BAK Basel Economics launched the development project «Monitoring Life Sciences Locations»²⁴. For the first time, this project links information on the performance of life sciences regions with indicators that measure the specific framework conditions and location factors that are relevant for life sciences.

How well the life sciences industry performs in a specific location depends on both the overall health of the life sciences market itself and the factors that characterise the location and influence the industry.

The location factor that has the greatest effects on the life sciences industry is the capacity for innovation. Indicators for the innovation capacity of a region include R&D expenditures, availability of qualified workforce, the quantity and quality of universities, and output indicators such as the number of publications and patents. The ability to convert these innovation resources into new products and production processes is equally important. This ability can be measured by looking at the flexibility of the entrepreneurial environment (e.g. by comparing the administrative burdens on start-ups and the availability of venture capital) and the regulatory environment (e.g. regulations on science and new technologies or the registration of new medicines). And last, the general framework conditions – such as product and labour market regulations, taxation, or a region's accessibility– must not be overlooked as all these factors effect companies and the availability of labour.

This set of indicators was investigated within the Monitoring Life Sciences Locations project of BAK Basel Economics. Even though it is not yet possible to completely clarify the story and explain the causality behind a region's performance by means of these analysed factors, they nevertheless allow us to examine at least part of the structure and future potential of the specific regions. In its initial stage, the Monitoring Life Sciences Locations project of BAK Basel Economics concentrated on a limited number of fifteen life sciences regions – most of them regions in which leading companies of the international life sciences industry are located²⁵.

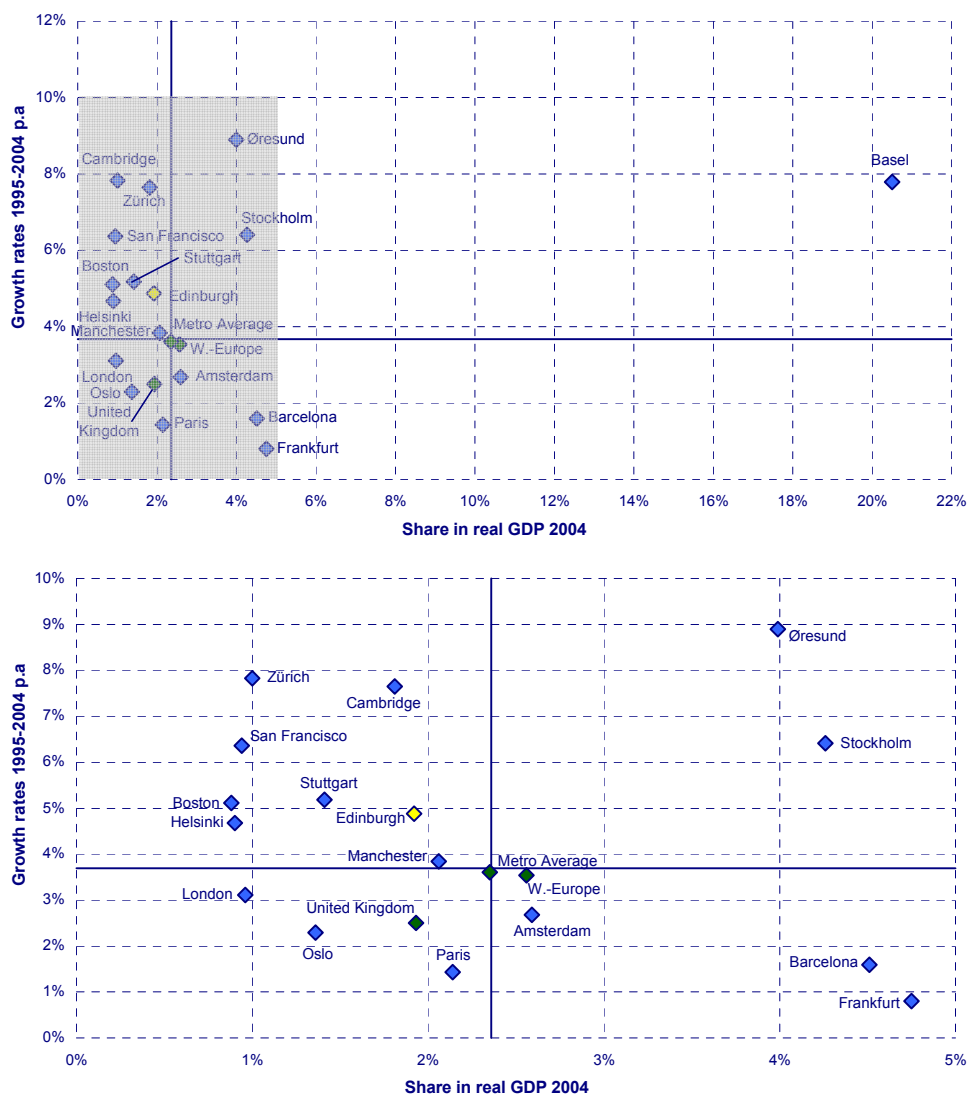
²⁴ The first set of findings can be found in the recently published Life Sciences Report 2005 (BAK 2006).

²⁵ The list of benchmark regions included in the first stage of the Monitoring Life Sciences Locations project by BAK Basel Economics comprises: the three Swiss regions of Basel, Zurich and Geneva (Swiss cantons of Geneva and Vaud), the US regions of New Jersey, Boston, New York, Southern California (Los Angeles and San Diego) and the San Francisco Bay Area, the British regions of Oxford, Cambridge and London, and Munich, Paris, Vienna and the Øresund region.

5.2.3 Performance of the Life Science Industry

Fig. 44: Growth contribution of the Life Sciences Industry 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: Life sciences industry approximation by means of data for the chemical-pharmaceutical industry.
 The second graph expands the gray area from the first graph.
 All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.
 Reading example: See note on Figure 22.

Source: BAK Basel Economics – Monitoring Life Sciences Locations

Edinburgh is, so far, not included in the Monitoring Life Sciences Locations project of BAK Basel Economics and data, balanced for international comparison, is not

available. BiGGAR Economics (2004) estimated that the life sciences industry in Edinburgh accounted for 10'000 jobs in 2004. However, this includes not only the fields pharmaceuticals/biotechnology and medical devices, but also jobs in support and supply companies, teaching and researching jobs in academic institutions.

For benchmarking analysis, we are forced to restrict the analyses to performance data on the chemical-pharmaceutical industry. Because this limitation neglects the medical devices and to a great extent the R&D part of the life sciences industry, conclusions have to be drawn cautiously. For the top end of the life sciences scale (with respect to value added), the approximation is adequate since most of the leading regions are powerful in the pharmaceutical industry. Not by accident; the pharmaceutical industry – due to its high productivity – very often outpaces the remaining segments. However, regions (e.g. Zurich) that have a strong focus on the medical devices segment also deserve our attention.

In Basel, the life sciences sector directly accounts for no less than 23 percent of the region's gross domestic product. While the comparable figure for other regions including Edinburgh is only around one to five percent, it would be wrong to conclude that the life sciences industry is of little importance in these regions.

The approximation by means of data for the chemical-pharmaceutical industry distorts our conclusions: Whereas in some regions the approximation holds up well (e.g. Basel), it falls flat in regions which encompass high shares of traditional and basic chemistry (e.g. Barcelona) or regions focused on the life sciences segments of medical devices or research (e.g. Zurich). The performance of the life sciences industry depends to a considerable extent on the mix of the sub-industries of pharmaceuticals, agricultural chemicals, medical devices and research firms in the regions. Whether the life sciences industry in a given region is oriented more toward production (with high value added) or toward research (with high labour intensity and lower productivity) plays a decisive role in evaluating performance.

The life sciences industry (in matters of the chemical-pharmaceutical industry) is less important in Edinburgh than on a Metro Average. The industry displays a respectable growth rate of nearly five percent between 1995 and 2004. This is almost twice the growth in the total economy. In Scotland, for comparison, the life sciences industry is slightly less important in the total economy than for Edinburgh and the industry was not able to grow as much as the Metro Average. However, both Metro Edinburgh and Scotland grew faster than the UK as a whole.

5.2.4 Driving forces behind the life sciences industry

The Monitoring Life Sciences Location Report reveals that a region's potential must not necessarily coincide with its current performance. Some regions possess good

potential, e.g. a strong research base or a high number of small young companies, but display poor or average performance. These regions may still be in the “capital burning” phase, i.e. the substantial innovative potential created has not yet resulted in an increase in value added. Pay-offs come after a considerable time-lag. Framework conditions and location factors go a long way to determining the longer-term performance of life sciences locations. Over the short and medium term, however, the performance pattern need not reflect the picture drawn by the framework conditions and location factors. Only jointly do the indicators on the industry’s performance, the life science market and the relevant location factors, draw a true picture of a region’s potential as a life sciences industry location.

Many regions exhibit much better performance than one would expect from a review of the location factors. This applies in our project above all to the Øresund region, Basel, and Paris. London, Munich, Milan and New Jersey would also fall within this group, but with a much smaller discrepancy between performance and the location factors. All these regions are traditionally strong in the chemical-pharmaceutical industry and perform well to excellently but do not attain an equally high ranking with regard to life sciences specific regulations, innovation capacity and general conditions for both companies and highly qualified employees.

On the other hand, some regions appear to benefit only little to moderately from their advantageous location factors. They obviously possess potential and may well show much better performance in the future. This sort of potential is especially evident in the cases of Zurich, New York, San Francisco Bay Area, Boston and Oxford. They all do well regarding innovation capacity (scientific publications, patents) but so far have not been able to translate these into concrete performance. What is true for Edinburgh is yet to be examined.

5.2.5 Conclusion: Life Science a future source of growth

The life sciences market is one of the most promising markets of the future. New technologies, expanding wealth in the industrialised nations and the resulting growth of demand for healthcare products, the demographic ageing of society and the appearance of new diseases pave the way for continued growth.

Globalisation brings new challenges such as an increased pace of change and intensified competition. One way for Western European and North American regions to answer these challenges is by focusing on value-creation-intensive sectors such as life sciences and intensifying their efforts in innovation. Edinburgh is thus advised to cultivate its innovative resources, to promote the cooperation and collaboration of private and public research, and to pave the way for a life sciences cluster.

5.3 The Tourism Industry

The first objective of this chapter is to discuss the importance of the tourism industry to Metro Edinburgh. Secondly, there will be a short analysis of the performance of Metro Edinburgh as a tourism destination. Finally, the topic of market competition and competitiveness will be addressed.

5.3.1 Importance and structure of tourism

The tourism industry is neither classified nor measured as an economic sector, but disperses and reflects itself in a large number of industries. Demand by tourists, calculated by multiplying the numbers of tourists by the amount they spend, triggers direct and indirect economic effects in many economic sectors, such as the transport or retail sectors. An adequate and accurate estimation of the direct and indirect effects of demand by tourists requires an elaborate database and is conducted with the aid of an impact model, such as the BAK Tourism Economic Impact Model («BAK TEImodel»)²⁶.

TOURISM ECONOMIC IMPACT MODELS

Objectives of the «BAK TEImodel»: The tourism economic impact model developed by BAK Basel Economics makes it possible to calculate the overall effects of tourism demand in a regional economy. In particular, the value added and employment effects generated by tourists are estimated and analyzed. The «BAK TEImodel» is constructed in such a way that it can also be used for simulations. For example, the model lends itself to calculation of the effects of a given increase in the volume of tourism demand. Economic impact models for tourism are based on input-output analyses. The tourism demand, as calculated by multiplying the numbers of tourists by the amount they spend, triggers direct and indirect economic effects.

Questions answered by the «BAK TEImodel»

How many tourists does the studied area host?

How much do tourists spend in this area?

What portion of regional GDP is due to tourism?

How many jobs are created?

How much tax revenue is generated?

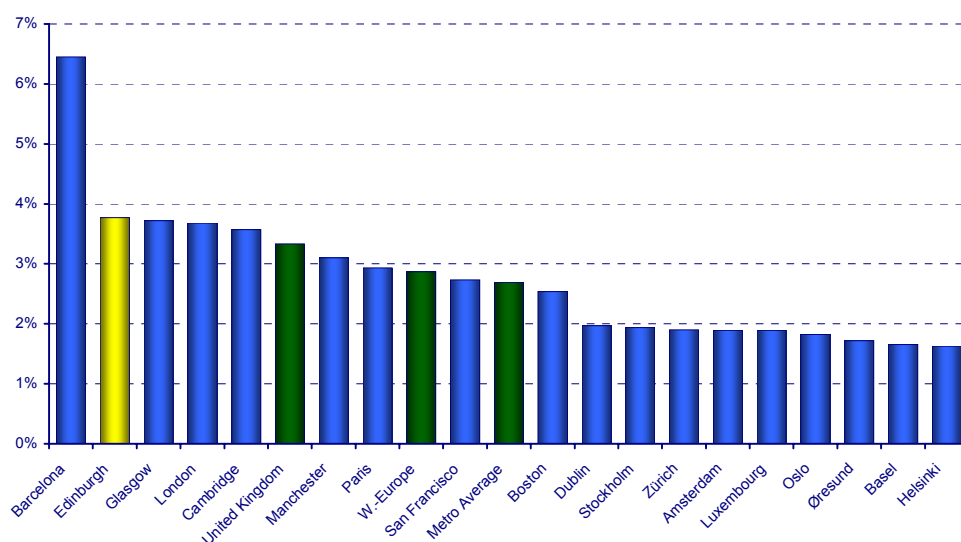
The most important industry related to tourism is the hotels and restaurants sector. However, it has to be kept in mind that nearly half of the gross value added (GVA) achieved in the restaurants sector is not assignable to tourism but rather to the population of the city and its surroundings.

²⁶ For further information please see www.bakbasel.com or Kämpf, Roth (2005).

The hotels and restaurants sector accounts for roughly 4% in the aggregate regional GVA of Metro Edinburgh, as can be seen in the figure below. The sector's contribution is thus of very high importance. In this regard, Edinburgh compares well to other UK cities such as Glasgow and Manchester. Dublin lags behind with its lower contribution of nearly 2%.

Fig. 45: Share of Hotel and Restaurants in regional GVA in %

In national currency, 2004, nominal, in percent



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details.

Source: BAK Basel Economics

Research shows that the entire contribution of tourism is more than 10% of the aggregate GVA in Metro Edinburgh. The important role of the tourism industry in Edinburgh is reflected in the number of overnight stays and tourists' spend. In the year 2003, there were roughly 4 million trips in Metro Edinburgh resulting in 13 million overnight stays. The value of tourism is almost £1 billion.

The city tourism demand is mainly sub-divided into a business and a leisure market. The City of Edinburgh exhibits a particularly high share of leisure tourists (over 60%). According to a study led by «BHP Hanser und Partner AG»²⁷, most European cities show a clearly lower share of leisure tourism, including Madrid, Glasgow, Paris, and Amsterdam.

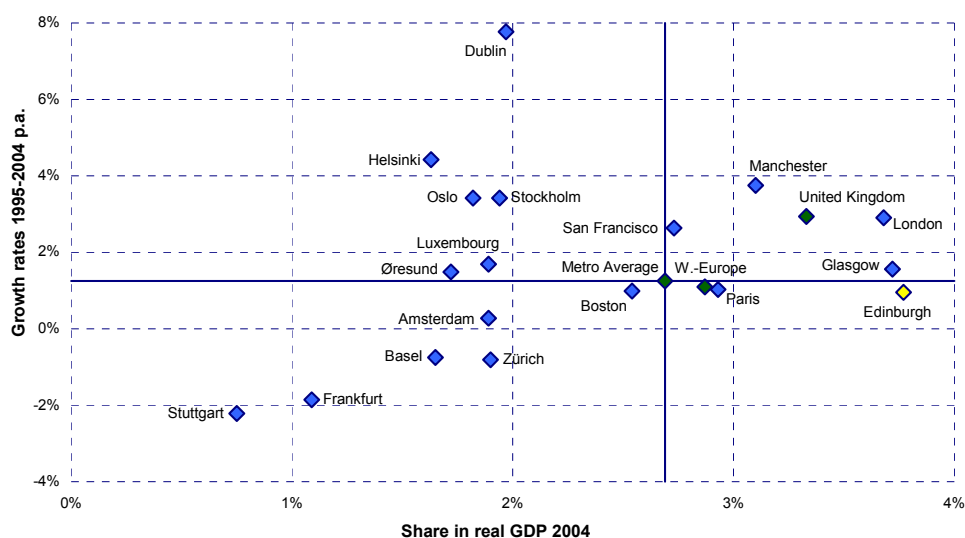
²⁷ Kuster, Plaz (2004).

5.3.2 Performance of Metro Edinburgh in the urban tourism

The question poses itself in view of the considerable impact of the tourism industry in Metro Edinburgh: How well has the tourism industry developed in the past years, i.e. is the growth rate of the tourism industry above or below average?

Fig. 46: Growth contribution of Hotels and Restaurants 1995 to 2004

based on USD at 1995 prices and 1997 PPP



Note: All regions including Edinburgh are the metropolitan regions. Metro Average is not the sample average but built with 28 metro regions. See Appendix for details. Reading example: See note on Figure 22.

Source: BAK Basel Economics

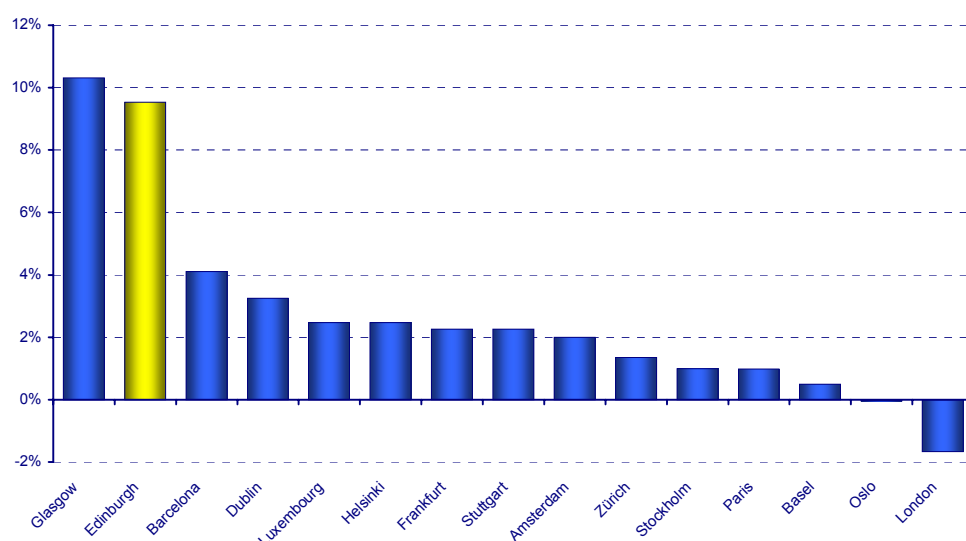
The figure above displays both the shares and the growth rates of the real GVA in the hotels and restaurants sector between 1995 and 2004. Metro Edinburgh barely realises an internationally average performance (above 1% growth p.a.), and does not compare favourably even to its most direct competitors. The extraordinary growth of Dublin's hotels and restaurants sector between 1995 and 2004 is at least partly a result of the very high annual growth rate of the aggregate economy in Dublin in the same time period and not due exclusively to tourism. On this account, the development of overnight stays is the fundamental indicator to compare tourism performance²⁸.

²⁸ When interpreting these figures – which are surprising in the light of local experience and the analysis below – a few things have to be kept in mind: The data is for the whole Metro Edinburgh, not only the City of Edinburgh, which is most often used in other comparisons. Furthermore, the consumption of local residents is part of this sector as well. Population growth in Metro Edinburgh was very low, especially compared to other regions like Dublin, which limits the growth potential. Finally, nominal growth was much higher (+5.8% p.a. since 1995).

The comparison of average annual growth rates of overnight stays between the years 1998 and 2002 indicates that the City of Edinburgh has experienced a strong growth (+9.5% p.a., see figure below) in recent years, performing just as well as its competitor Glasgow. «The European Cities Tourism Report 05/06»²⁹ finds equally good results for the growth rates of bed-nights over a longer time period (1998-2004) and a larger sample of cities: The City of Edinburgh is among the top 5 performers of the «Premier League Cities» with a growth of approximately 7% p.a., and performing well above the international benchmark average of 2.9%, suggesting that Edinburgh is recovering fairly well from the impact of Foot and Mouth Disease and 9/11.

Fig. 47: Growth of overnight stays

1998-2002, growth in percent p.a.



Note: All regions including Edinburgh refer to the cities.

Source: ECT (2005)

5.3.3 Competitiveness

The metropolitan area of Edinburgh offers a wide range of visitor attractions and activities, encompassing historical and cultural interests, sports and entertainment. A large number of events take place throughout the year which allows the city to promote itself as a year round tourist destination and to reduce the seasonality without fostering business tourism as other cities³⁰. In addition, Edinburgh serves

²⁹ ECT (2005).

³⁰ Business tourism does not only differentiate from leisure tourism in terms of criteria for a city's attractiveness, but also in terms of the seasonality of demand and the tourist's spending profile.

as a gateway to the natural beauty of Scotland's Highlands. The competitiveness to Glasgow in this regard is very important and has to be accounted for.

Since part of the criteria determining a city's attractiveness differs between leisure and business purposes, it is important to compare a city's performance and competitiveness with cities playing in the same league, i.e. targeting approximately the same sub-division of tourists. In the leisure market, Metro Edinburgh faces numerous and diverse competition, particularly with the metropolitan regions of Glasgow, Dublin, Manchester and Cardiff and even with London, Amsterdam, Vienna, etc. A benchmarking analysis should thus definitely incorporate Edinburgh's close competitors (degrees 1 and 2).

Fig. 48: Degree of competitiveness to Metro Edinburgh in the leisure market

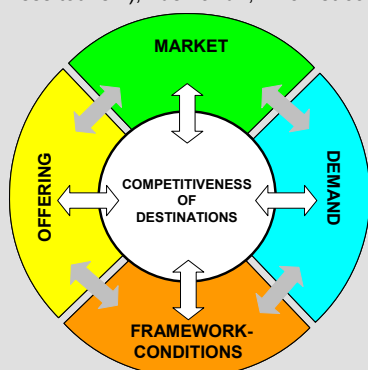
| Degree | Competitors to Edinburgh |
|--------|---|
| 1 | Dublin, Manchester, Cardiff, Glasgow |
| 2 | Frankfurt, Berlin, Basel, Zurich, Luxembourg, Vienna, Barcelona, Amsterdam, London, Paris, Oslo, Stockholm, Helsinki, Stuttgart, etc. |
| 3 | Lyon, Venice, Milan, Marseille, etc. |
| 4 | Salzburg, Bern, Lübeck, Bordeaux, Trier, Karlsruhe, Bremen, Baden-Baden, Malta |

Note: 1=very strong competition, 4=rather weak competition.

Source: FECTO (1996)

The «BAK Competition Model for Destinations»

For measuring the competitiveness of tourism destinations, BAK Basel Economics possesses a highly attractive and comprehensive database. Methodologically, the analyses are based on the «BAK Competition Model for Destinations». This model provides an overview and the combined analyses of the four elements that underlay the success of destinations: «offering» (as infrastructure for leisure and business tourism), «demand», «market/competitors» and «framework conditions» (as accessibility)³¹.



Offering: hotel and restaurant quality, prices, attractiveness for leisure and for business tourism, cultural offerings, etc.

Framework-conditions: accessibility, labour costs, cost of purchased goods and services

Demand: length of holidays, seasonality of demand, degree of internationalization

Market: competitors, market share, international sales, networks

³¹ For further information please see www.bakbasel.com or Kämpf, Weber (2005).

Fundamental to the success of tourism destinations are its accessibility, its objects of interest, the attractiveness of the surrounding areas, cultural offer and events. Accessibility to Metro Edinburgh is discussed in detail in Chapter 4, but in short, BAK Basel Economics' assessment is that Edinburgh's accessibility is on average with respect to accessibility from outside Europe and slightly below average within Europe. However, Edinburgh is in line with Glasgow and Dublin in terms of accessibility – an important factor for the role as gateway to Scotland's Highlands.

In order to maintain and improve the accessibility of Metro Edinburgh, constant and significant public investments are needed. Investment in the public realm is also important for improving the attractiveness of Metro Edinburgh as a tourism destination. Public investments especially in the field of cultural offerings can be regarded as a major driver of competitiveness in European city tourism.

Competing with Paris, Rome, London and Berlin in terms of objects of interest is unrealistic for smaller cities. However this kind of competitive disadvantage can be offset (as shown in the BAK city tourism report³²) by attractive surroundings. BAK Basel Economics has found that the smaller a city is the more important attractive surroundings are. Edinburgh's tourism industry is successful because Edinburgh is a city with a relatively high number of attractions, cultural offerings and events, and has great historical and political importance as well as providing a gateway to the beauty of the surrounding landscape and the rest of Scotland

Edinburgh should take account of Glasgow's close proximity, especially in competing against larger cities. Glasgow should not be viewed solely as a close competitor for Edinburgh's tourism industry, but also as a logical partner for collaboration. The two cities could do so much more to market themselves together, especially internationally, thereby achieving efficiencies and stronger brand awareness. Competitive advantage could also be achieved by introducing joint packages for visitors for instance.

5.3.4 Conclusion: Tourism

In view of the internationally high share of the hotels and restaurants sector's contribution to the aggregate economic GVA, tourism is a key industry to Metro Edinburgh. The development of tourism demand over the last years has been very strong and can be seen in Edinburgh's performance figures for the tourism industry. Metro Edinburgh enjoys a good location and a strong potential for leisure tourism. Accordingly, its share of leisure tourism is much higher than its share of business tourism. This shows very well the attractiveness and the high tourism competitiveness of the city.

³² Kämpf, Kübler (2001).

6 Edinburgh's Strategic Position and Policy Options

BAK Basel Economics has been asked by Scottish Enterprise Edinburgh and Lothian (SEEL) to provide an international benchmarking analysis for Metropolitan Edinburgh. The Metropolitan Edinburgh Economic Analysis and Benchmarking Report 2006 compares and analyses the performance of Metropolitan Edinburgh³³ against a range of UK and international comparator regions. It describes the current economic context for Metro Edinburgh and benchmarks it against 19 metropolitan regions. The benchmarking includes the economic performance, sectoral strengths and weaknesses as well as the quality of the location. The report identifies the key challenges facing the region and suggests some strategic options for the future economic development of the metropolitan region.

Findings from the benchmarking analysis

Edinburgh's economy: a broader view

The first section of the report takes a broader view. It provides an overview of the economic conditions in Metro Edinburgh and its development over the last 25 years. A specific focus is on the sectoral structure of the economy, to gain a better understanding of economic developments by taking the heterogeneity of economic structures and developments into account.

Metro Edinburgh presents itself as a region in a catch-up position, and indeed has caught up substantially. GDP increased about 80 percent from 1980 to 2004 in Metro Edinburgh. That this growth is about equal to the growth experienced in the UK and a Metropolitan Average could be misleading because Edinburgh experienced less population growth, which results in an increase in GDP per capita which is more robust than in Western Europe, the UK and the Metropolitan Average. The success of Metro Edinburgh is due to productivity growth as well as increasing the labour usage, which can be seen in an increasing employment-to-population ratio.

As is typical for the relationship between a city and its metropolitan region, the City of Edinburgh is more productive and has more jobs per capita than the metro region. People live in the outskirts and commute to the city for work. Further, the

³³ Metropolitan region of Edinburgh (also named 'city-region') is defined following the concept of functional urban region. Metro Edinburgh consists of Edinburgh City, Clackmannan-shire and Fife, East Lothian and Midlothian, West Lothian, Scottish Borders and Falkirk.

city profits from the higher density with economies of scale and scope, network effects and spill-over effects. Indeed, with these advantages, a larger gap between the city and the metro region would have been expected than is actually observed. Furthermore, for most of the time, GDP in the city and GDP in the metro region develop along equal growth paths. But the data suggests that beginning around the year 2000, there was a step change in the city. Since that time, GDP growth as well as productivity growth in the City of Edinburgh has clearly outperformed Metropolitan Edinburgh. It seems that, with some delay compared to other metropolitan regions, Edinburgh City is now really taking advantage of its density and the renaissance of its centre.

Edinburgh's economy is service driven, as would be expected in a Western European metropolitan region. But within the services sector, Edinburgh's orientation is more towards politically driven parts (Political Sector) than towards typical urban services for businesses and individuals (Urban Sector). The Urban Sector has less weight in Edinburgh's economy than is typical in a metropolitan setting. But it is successful with respect to growth. Especially since 2000, it has been the Urban Sector which has driven the success of Edinburgh relative to the Metro Average. Furthermore, it is the Urban Sector which explains the renaissance of the City since 2000 within Metropolitan Edinburgh. The second largest sector in Edinburgh, with more weight than usual in European metropolitan regions, is the Political Sector. Interestingly, the Political Sector is more present in the Metro Region of Edinburgh than in the City. This is primarily due to a higher weight of education, health and the primary sector in Metro Edinburgh compared to the Metro Average. Although the Political Sector in Metro Edinburgh did expand faster than in the Metro Average, growth of the sector was limited compared to other parts of the economy. It should not be forgotten that education and especially the higher education institutions which are part of the Political Sector provide an important resource for long term growth prospects, namely a well educated labour force. Therefore, at least within some sub-sectors of the Political Sector, a higher share may not be a disadvantage. Apart from the Urban and Political Sector the remaining economy can be split into three more sectors, New Economy, Old Economy and Traditional Sector. For different reasons none of these sectors can be expected to contribute substantially to Metro Edinburgh's growth. They are either too small or their growth in a high wage setting seems limited except for certain niche areas such as within the Life Science sector.

The sectors providing metropolitan services will be the prize-winning part of the economy for Edinburgh, and here a shift of focus from the Political towards the Urban Sector could improve prospects even further. It seems that – especially since around the year 2000 – Edinburgh has moved in the right direction.

Benchmarking Edinburgh against other metropolitan regions

Comparing Edinburgh only with averages neglects regional diversity. Therefore, Metro Edinburgh has been benchmarked against the individual experience of 19 metropolitan regions. The regions chosen as benchmarks are an ambitious sample: It includes the more successful regions.

With only 1.44 million inhabitants size is an issue for Metro Edinburgh compared to other metropolitan regions. London, Boston or Frankfurt are by far larger. Size of a region can matter for a number of reasons. It has to be remembered that Metro Edinburgh clearly plays in the league of mid-size metropolitan regions, not in the premier league.

When comparing the level of GDP per capita, the central economic indicator for a region's economy, the performance of Metro Edinburgh is not satisfying. In 2004, Edinburgh ranked 15th out of 20 metro regions. Compared to the broader Metro Average Metro Edinburgh's GDP per capita is 15 percent lower. For the productivity level, the gap is even larger (more than 20 percent).

As discussed above, Metro Edinburgh has a recent history of successful growth. Indeed, this is reaffirmed by the more focused benchmarking analysis: Within the ambitious benchmark sample Edinburgh ranks 12th out of 20 with respect to GDP per capita growth in the period 1995 to 2004. A bit of a drawback is that Metro Edinburgh's position is less positive within the sub-sample of Anglo-Saxon regions. The impression is that Metro Edinburgh's success within the benchmarking sample is to some extent due to advantageous UK framework conditions and not region specific success. But in recent years Metro Edinburgh's performance has improved: Between 2000 and 2004 it was ranked second in GDP per capita growth, thereby beating most of its UK competitors as well.

From the two components driving GDP, labour usage and productivity, Metro Edinburgh is more successful in labour usage by increasing its employment-to-population ratio. Productivity growth from 1995 to 2004 is at the lower end of the benchmarking sample. Given that Metro Edinburgh lags behind in productivity levels, this point should not be ignored.

From a sectoral view, it is the Urban Sector which is most important for Edinburgh's economy. Although its share in Metro Edinburgh's economy is smaller than in most other metro regions, its contributions to Edinburgh's growth is in line with that in other metro regions due to higher growth rates. Much of this encouraging observation is due to the business and financial services sector, one of the core components of the Urban Sector. Furthermore, this development has become more pronounced in recent years and is focused on the City of Edinburgh. The renaissance of the city (and the usage of advantages of density and economics of

scale and scope) started somewhat late in Edinburgh, but it now seems to be progressing well. Policy should use this momentum and support this process in the future.

Potential in certain niches notwithstanding, the remaining four sectors are – for different reasons – hard to see as the major drivers of Edinburgh's future growth. Other regions in the benchmarking sample can rely on the New Economy or the structural strong old economy as major drivers of growth. The New Economy was a huge success story in Edinburgh until the year 2000. But since 2000, Edinburgh has had to cope with a substantial decline in the sector, much sharper than in other regions. Even if the New Economy recovers, much potential in Edinburgh is gone. It is hard to see how the New Economy could again be a major driver of economic growth in the near future. The Old Economy is a sector which can shift a metropolitan economy into a higher gear. But in Edinburgh, even if successful, its share today is too small to have a substantial influence on overall economic growth, at least for quite some years to come. As the Political Sector and the Traditional Sector both have limited growth potential in a high wage Western European setting in general, it is the Urban Sector which remains for Edinburgh as the major driver of economic growth. Fortunately, although somewhat late the more recent data shows Edinburgh moving in the right direction with quite some momentum.

Location Edinburgh: Quality

To complete the benchmarking strengths and weaknesses of Metro Edinburgh as a location for living, working and doing business have been analysed and compared. Benchmarking the location quality of Metro Edinburgh paints a picture of a region with a variety of advantages, but a few shortcomings as well.

There is a high quality and quantity of resources necessary for innovation. The labour force is well qualified. Edinburgh is also an attractive place to live and work for highly qualified people, as the strong increase in the share of the labour force with higher education shows. Apart from a large number of institutions providing higher and further education, Edinburgh possesses world class universities. A limiting factor in this field is the size of the region, which limits the advantages of scope and scale in research even if the relative amount of top quality research is amongst the highest of all regions. Less monetary resources are put directly into research and development (R&D) and most other regions score better. Metro Edinburgh, which has a substantial share of its economy in the producing sector and which has the strategic goal to grow in some of these industries, should be aware that without substantial efforts in R&D, it will be difficult to gain sustainable producing industries in a high wage setting of a Western economy.

In a second set of location factors, Edinburgh profits from being part of the UK. Labour and product markets are comparatively liberal in the UK, and the tax burdens are lower than on average in a Western European setting. Particularly in labour market regulation and taxation of highly qualified individuals, Edinburgh enjoys comparative advantages against its competitors from the continent (including the Nordic regions). Edinburgh should be aware that this favourable position could weaken in the future. Indeed, with respect to product market regulation and company taxation, Edinburgh's position relative to its competitors has already somewhat deteriorated. A similar picture emerges for labour costs. Edinburgh had quite an advantage over the Western European average, but since the end of the nineties, it has lost some ground. Still, for a metropolitan region in Western Europe labour cost are comparatively low, especially compared to London.

Finally, Metropolitan Edinburgh is a peripheral City on the edge of Europe and consequently has below average international accessibility, especially in a European context. Still, the gap is not dramatic. Edinburgh should be aware of this fact and not base its strategies on industries which require the best accessibility as for examples some parts of the financial services do.

Key Sectors of Edinburgh

Three industries are of special importance to Edinburgh and its future prospects for economic development: the Financial Sector, the Life Sciences Industry and Tourism. These industries are well present in Edinburgh, depend heavily on location factors Edinburgh is strong in, and/or offer high growth and value added potential for the future.

Banking is a huge success story for Metro Edinburgh. Over the last ten years, and especially since 2000, banking experienced an extraordinary increase in jobs and output. Although not as dynamic as banking, the insurance industry of Metro Edinburgh is well positioned. As long as location factors for financial services stay favourable, there are no reasons to believe that the success story should suddenly end. Regulation is a very important factor for financial centres to prosper. An issue more at the influence of regional policy is the sufficient supply of highly qualified labour. Being attractive as a region to life and work for highly qualified persons is a strategy supporting the financial sector. Finally, "critical mass" is needed in the Financial Services Sector. In particular the close inter-relationship between the City of Edinburgh and the City of London is an important asset to build.

The life sciences market is one of the most promising markets of the future. The development of new technologies, expanding wealth in the industrialised nations and the resulting growth of demand for healthcare products, the demographic

ageing of society and the appearance of new diseases seem to pave the way for continued growth. Globalisation brings new challenges such as an increased pace of change and intensified competition. One way for Western European and North American regions to answer these challenges is by focusing on value-creation-intensive sectors such as life sciences and intensifying their efforts in innovation. Edinburgh is thus advised to cultivate its innovative resources, to promote the cooperation and collaboration of private and public research, and to pave the way for a possible life sciences cluster.

In view of the internationally high share of the hotels and restaurants sector's contribution to the economy, tourism is a key industry in Metro Edinburgh. The development of tourism demand over the last years has been very strong and can be seen in Edinburgh's performance figures for the tourism industry. Edinburgh enjoys a good location and a strong potential for leisure tourism. Accordingly, its share of leisure tourism is much higher than its share of business tourism. This shows very well the attractiveness and the high tourism competitiveness of Edinburgh.

Strategic Options

Key Challenges

From this analysis, it is clear that Metro Edinburgh is facing some important challenges:

- Overall productivity levels, although clearly improving, should be the primary focus of economic policy. Productivity levels have a huge influence on the competitiveness of a region and the wellbeing of its inhabitants. To bring productivity up to the level of its international competitors is Edinburgh's number one challenge for the future.
- Metro Edinburgh possesses the resources for a successful knowledge-driven economy: High University quality and quantity; a high standard of human capital in the labour force; and is an attractive place. Metro Edinburgh should be getting more from these assets than it gets today. A key challenge for the future is to make more efficient use of these resources.
- Scale is an issue for Metro Edinburgh. Due to its size, Metro Edinburgh clearly competes in a second tier of metropolitan regions in Europe. In 2 key business areas, financial services and tourism, size plays an important role. Closer collaboration with surrounding regions, especially Glasgow, would add to the weight of these key sectors on a European or even world-wide scale. For Financial Services in particular, it is important to use the close inter-relationship

between the City of Edinburgh and the City of London. This is an asset to build on given London's status as a global financial centre.

Future Opportunities: Sectoral mix

Many metropolitan regions in highly developed economies show a specific industrial emphasis. They can be characterised as high tech regions, business focused metropolis, or consumer/leisure cities. For many metropolitan regions, it is advisable to concentrate on one area they are especially strong in. For Metro Edinburgh, the conclusion is different: Its specific strengths allow for a more mixed strategy.

The Financial Sector, one of the most important components of a business city, is already strong and growing fast. The success of tourism shows that Metro Edinburgh also has strengths as a leisure or consumer city. Add to this the high level of human capital and the quality of research from its major institutions - there is also a sound basis for high tech industries. Whilst many of the hardware producing parts of the new economy are probably gone for good in Metro Edinburgh, Life Sciences offers particular opportunities. Metro Edinburgh has world leading niches like Stem Cells research which look set to become much more important over time. The benchmarking exercise shows considerable potential for Life Sciences in Metro Edinburgh, but there needs to be further investigation to build an evidence base for strategic decisions. Some caution is also necessary as the size of the High Tech sector is comparatively small in Metro Edinburgh. Even if highly successful, it is therefore unlikely to be a major driver of Metro Edinburgh's growth for quite some time to come, as it needs time to built up weight in Metro Edinburgh's economy. In addition, the High Tech sector as a whole has been vulnerable to structural shifts over the period covered by this report - with electronics in particular taking a major hit in the late 1990s. Concentrating on high value activities, i.e. research and development and supporting close networks between companies and research institutions, should ensure a more sustainable growth.

A key advantage for Metro Edinburgh is that the requirements for these sectors in terms of attractiveness of place and quality of life and high skill levels are mutually reinforcing. Continued investment in place attractiveness of Metro Edinburgh should ultimately make an important contribution to the growth of the key sectors.

Metro Edinburgh needs a mixed strategy focused on its key strengths.

Future Opportunities: Building Capacity for Greater Innovation

Innovation is undoubtedly a key issue for any developed economy to stay competitive in a globalised world. An innovation fostering environment has to be at the top of the economic policy agenda. An attractive, open and tolerant environment for incoming labour, especially highly educated labour, from the UK or from abroad can help local development tremendously.

A further important issue relating to innovation is the more effective use of the available knowledge resources. Strengthening the links between business and research institutes should help direct resources to the most innovative activities. Support for networking and setting incentives to innovate are measures regional agencies should utilise. Such a policy should comprise businesses, private and public research institutions, individual researchers and the higher education institutions. Other relevant policy areas include regulation and taxation, where incentives to innovate should be promoted.

The critical challenge is to build the capacity to drive productivity growth in the future. Growth will be limited unless this is done.

Future Opportunities: City Collaboration

A common issue for the sectors mentioned above is scale. For different reasons, all of these sectors can profit from increasing their scale and critical mass. There are a number of key areas where collaboration with Glasgow in particular could bring major benefits:

- Co-operation, co-ordination and networking between the Higher Education Institutes and other research facilities could bring economies of scale and scope in knowledge creation and increase the economic impact of research.
- Co-ordinated marketing and shared large events could increase visibility for international tourism. Such collaboration could increase market share for Scotland as a whole.
- For business services, the issues are around creating a larger labour market through improved accessibility as well as the potential for a division of functions.
- The central issue of attractiveness as a place to live and work can also be supported by greater collaboration: by increasing the variety of environments offered, the housing opportunities and growing the available labour market.

Although competition between the two cities will and should continue where appropriate, Glasgow offers more opportunities than threats to Metro Edinburgh.

Collaborative effort could generate the visibility and critical mass needed to withstand international competition and achieve greater success globally.

Future Opportunities: Advantageous UK framework conditions

Metro Edinburgh, as part of the UK, enjoys a liberal economic setting. The favourable regulatory and taxation environment supports innovation. This facilitates relatively quick and easy adaptation within the economy to new demands. Metro Edinburgh should be aware of these advantages, value them highly, and include them in any strategic assessment. At the same time, does the UK trend of devolving power and responsibility provide more leeway at regional level? If so, Metro Edinburgh could and should use these newly acquired freedoms.

Conclusion

Metro Edinburgh benefits to some extent from UK advantages. This favourable position is not guaranteed for the future, e.g. as labour and product markets become more flexible elsewhere. It should be the goal to foster specific regional success in addition to using these UK advantages. A strong innovation push is required - the basic resources are available, but they have yet to be put to the most productive use.

Whilst the GDP as well as the productivity gap between Metro Edinburgh and its benchmark regions is stark, the most recent evidence shows that gap is reducing. The challenge now is not just to keep up with competitors in the future but, by delivering a step change, pursue a leading position. If this does not happen, there is danger of Metro Edinburgh losing ground particularly if some of its key location advantages diminish. Metro Edinburgh needs an ambitious goal - to become one of the leading city regions in Europe.

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8 Annex

8.1 Regions Selected for Benchmarking

The choice of the regions for the benchmarking followed several criteria with the aim of comparing Edinburgh with the most relevant regions. These criteria can be described as follows:

1. Best performing regions. These regions achieved the highest growth rates of real GDP in the last 5 or 10 years. They are examples of economic successful regions to look at and learn from.
2. Regions with a similar sector focus to Edinburgh (high share of banking, of life sciences or of tourism). These regions are potential competitor regions to look at and to measure with.
3. Regions with a similar economic-geographical situation to Edinburgh (geographical position, bigness of the metropolitan area, density of population).
4. Some regions that guarantee the diversity with respect of economic systems (Anglo-Saxon, Continental and Nordic) and the variety of countries.

| Notation | Official name of regions used | Group |
|--|---|-------------|
| Edinburgh City | City of Edinburgh | Anglo-Saxon |
| Metropolitan Edinburgh (‘Edinburgh’ in benchmark section) | Aggregate of Nuts 3: City of Edinburgh, Clackmannanshire and Fife, East Lothian and Midlothian, West Lothian, Scottish Borders and Falkirk | Anglo-Saxon |
| | | |
| Amsterdam | Randstad (aggregate of Nuts2: Utrecht, Noord-Holland, Zuid-Holland) | Continental |
| Barcelona | Comunidad Autonoma de Cataluña (Nuts 2) | Continental |
| Basel | Cantons Basel-Stadt and Basel-Land | Continental |
| Boston | State of Massachusetts | Anglo-Saxon |
| Cambridge | Cambridgeshire (Nuts 3) | Anglo-Saxon |
| Dublin | Greater Dublin Area (aggregate of Nuts 3: Dublin, Mid-East Ireland) | Anglo-Saxon |
| Frankfurt | Frankfurt RheinMain (SK Darmstadt, SK Frankfurt am Main, SK Offenbach, SK Wiesbaden, LK Bergstrasse, LK Darmstadt-Dieburg, LK Gross-Gerau, LK Hochtaunus-Kreis, LK Main-Kinzig-Kreis, LK Main-Taunus-Kreis, LK Odenwaldkreis, LK Offenbach, LK Rheingau-Taunus-Kreis, LK Wetteraukreis, LK Giessen, LK Limburg-Weilburg, LK Vogelsbergkreis, SK Mainz, SK Worms, LK Alzey-Worms, LK Mainz-Bingen, SK Aschaffenburg, LK Aschaffenburg, LK Miltenberg) | Continental |
| Glasgow | Aggregate of Nuts 3: East Dunbartonshire and West Dunbartonshire, Glasgow City, Inverclyde and East Renfrewshire and Renfrewshire, North Lanarkshire, South Lanarkshire | Anglo-Saxon |
| Helsinki | Uusimaa (Nuts 3) | Nordic |
| London | Greater London (Nuts 1) | Anglo-Saxon |
| Luxembourg | State of Luxembourg | Continental |
| Manchester | Greater Manchester (Nuts 2) | Anglo-Saxon |
| Øresund | Metropolitan Copenhagen (aggregate of Nuts 3: København og Frederiksberg kommuner, Københavns amt) and Sydsverige (Nuts 2) | Nordic |
| Oslo | Oslo and Akershus (Nuts 2) | Nordic |
| Paris | Ile de France (Nuts 2) | Continental |
| San Francisco | San Francisco Bay Area (counties Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Sonoma, Santa Cruz, Napa, Solano) | Anglo-Saxon |
| Stockholm | Stokholm (Nuts 2) | Nordic |
| Stuttgart | Region Stuttgart (LK Esslingen, LK Göppingen, LK Ludwigsburg, SK Stuttgart, LK Böblingen, LK Rems-Murr Kreis) | Continental |
| Zürich | Canton Zürich | Continental |

The Metropolitan Average consists of:

- | | |
|-----------------------|--------------------------|
| • Bruxelles/Brussels | • Randstad |
| • København | • Oslo og Akershus |
| • Region Stuttgart | • Ostösterreich |
| • Region München | • Bassin Lémanique |
| • Berlin | • Basel (BS, BL) |
| • FrankfurtRheinMain | • Zürich |
| • Barcelona | • Espace Mittelland |
| • Comunidad de Madrid | • Uusimaa (Helsinki) |
| • Ile de France | • Stockholm |
| • Bas-Rhin | • Greater London |
| • Bouches-du-Rhône | • Metropolitan Glasgow |
| • Rhône | • Metropolitan Edinburgh |
| • Torino | • Greater Dublin Area |
| • Milano | • Massachusetts |
| • Venezia | • New York |

The Western Europe Average (WE15) consists of:

- | | |
|------------------|---------------|
| • Germany | • Nederland |
| • France | • Denmark |
| • Italy | • Ireland |
| • United Kingdom | • Luxemburg |
| • Spain | • Norway |
| • Sweden | • Austria |
| • Finland | • Switzerland |
| • Belgium | |

8.2 Structure of Sectors and Industries

| NACE-Code | Official name of industry | Driver Sector |
|-----------|--|--------------------|
| | PRIMARY SECTOR | |
| 01-05 | Agriculture, forestry and fishing | Political Sector |
| | SECONDARY SECTOR | |
| 10-14 | Mining and quarrying | Traditional Sector |
| 15-16 | Food, beverage, tobacco products | Traditional Sector |
| 17-19 | Textiles, garments, leather goods and shoes | Traditional Sector |
| 20 | Processing of wood | Traditional Sector |
| 21 | Paper- and board making | Traditional Sector |
| 22 | Printing a. publishing, reproduction of recorded media | Traditional Sector |
| 23 | Coke, refined petroleum products, nuclear fuels | Traditional Sector |
| 24 | Chemicals and chemical products | Old Economy Sector |
| 25 | Rubber and plastics products | Traditional Sector |
| 26 | Other products from non-metallic minerals | Traditional Sector |
| 27-28 | Metals and metal products | Traditional Sector |
| 29 | Mechanical engineering | Traditional Sector |
| 30 | Computers and office equipment | New Economy Sector |
| 31-32 | Electrical engineering | New Economy Sector |
| 33 | Precision and optical equipment, watches | Old Economy Sector |
| 34-35 | Motor vehicles and parts, other means of transport | Old Economy Sector |
| 36-37 | Manufacturing not elsewhere classified | Traditional Sector |
| 40-41 | Utilities (energy and water supply) | Political Sector |
| 45 | Construction | Traditional Sector |
| | TERTIARY SECTOR | |
| 50-52 | Trade and repair | Urban Sector |
| 55 | Hotels and restaurants | Urban Sector |
| 60-63 | Transport | Urban Sector |
| 64 | Postal service and telecommunications | New Economy Sector |
| 65 | Banking | Urban Sector |
| 66 | Insurance | Urban Sector |
| 67 | Banking and insurance related services | Urban Sector |
| 70 | Real estate | Urban Sector |
| 71 | Leasing of movables without operating personnel | Urban Sector |
| 72 | IT services | New Economy Sector |
| 73 | Research and development | Political Sector |
| 74 | Provision of services to companies | Urban Sector |
| 75 | Public administration, defence, social insurance | Political Sector |
| 80 | Education | Political Sector |
| 85 | Health and social services | Political Sector |
| 90 | Sewage treatment, refuse disposal | Political Sector |
| 91 | Interest groups and other associations | Urban Sector |
| 92 | Entertainment, culture and sport | Urban Sector |
| 93 | Personal services | Urban Sector |
| 95 | Private households | Urban Sector |

8.3 BAK International Benchmarking Programme

The «IBC BAK International Benchmark Club®» established in 1998, advises governments, administrations, trade associations, foundations and companies at the national and regional level on matters of business location quality and economic policy. The unique benchmarking database currently (IBC Database) covers about 450 regions and up to 64 industry and business sectors and is regularly extended and updated. This database allows the Clubs' members to assess in detail strengths and weaknesses of their region and to benefit from the experiences of other regions.

Globalisation and decentralisation are challenging the region's capacity to adapt and improve their competitiveness. It is at the regional level that the pressure to maintain economic growth and social development is felt most. This is why the research undertaken within the framework of the «IBC BAK International Benchmark Club®» focuses increasingly on the regional level. Benchmarking is a means to compare and assess the multitude of regional location factors and the success of national and regional policy strategies to use their potential. Since regions tend to be more specialised than countries, the «right» set of location factors that satisfies the needs of firms and people is particularly difficult to find. Benchmarking can therefore contribute to develop policy strategies that lead to sustainable economic growth.

The IBC Database is unmatched in Europe in terms of both regional and sector-specific differentiation and data actuality. The database includes indicators of economic performance as well as quantitative measurement of several location factors and framework conditions. In the remainder of this Chapter we will provide a rather quick overview on the data available and used in this research and its definitions. For a more comprehensive explanation the reader is referred to the International Benchmark Report 2005, especially Part III: Sources & Methodology.

8.4 The Performance Indicators of the IBC Database

Gross Domestic Product and Value Added

Gross domestic product at market prices is the final result of the production activity of resident producer units. It can be defined in three ways:

- GDP is the sum of gross value added of the various institutional sectors or the various industries plus taxes but minus subsidies towards products (which are not allocated according to sectors and industries). It is also the balancing item in the total economy production account.
- GDP is the sum of final uses of goods and services by resident institutional units (actual final consumption and gross capital formation), plus exports but minus imports of goods and services.
- GDP is the sum of uses in the total economy generation of income account (compensation of employees, taxes on production and imports minus subsidies, gross operating surplus and mixed income of the total economy).

Value added is defined as the difference between the value of output (= sales plus net increase in stocks of finished goods and work in progress) and the value of intermediate consumption (= the goods and services consumed in the production process). Value added may be calculated in gross or net terms. The data in the IBC database are gross, meaning before deduction of consumption of fixed capital.

Value added may be calculated at basic prices, factor costs, producers' prices or market prices. The 1995 European system of accounts (ESA 1995) recommends valuing output at basic prices or producers' prices. In the IBC database valuation is at basic prices, whenever possible. The only exceptions are data referring to the USA and the American regions. They are valued at market prices.

Basic Prices

The basic price is the price producers can obtain from the purchaser for a unit of a goods or services produced as output minus any tax payable on that unit as a consequence of its production or sale (i.e. taxes on products) plus any subsidy receivable on that unit as a consequence of production or sale (i.e. subsidies of products). It excludes any transport charges invoiced separately by the producer. It

includes any transport margins charged by the producer on the same invoice, even when they are itemized on the invoice.

Factor Costs

Factor costs may be derived from basic prices by subtracting any other taxes on and adding any other subsidies towards production that are not related to the number of units produced.

Market Prices

Market prices are those paid by purchasers for the goods and services they acquire, excluding deductible value added tax (VAT).

Constant Prices

Valuation at constant prices means valuation of flows and stocks in an accounting period at the prices of a previous period. The purpose of valuation at constant prices is to break down changes over time in values of flows and stocks into changes in price and changes in volumes. Flows and stocks at constant prices are said to be in volume terms. In the IBC Database, the basic year is 1995.

Purchasing Power Parities for Industry Comparisons

The use of exchange rates for international comparisons of output and productivity is not adequate for several reasons. One of the major drawbacks of exchange rates is that differences in price levels between countries are not reflected. Moreover exchange rates only deal with prices of tradable goods, and are subject to the impact of capital mobility and speculative movements.

Other than exchange rates, «Purchasing Power Parities » (PPPs) rely on relative prices. Purchasing power parities represent the amount of currency units for a country needed to buy a basket of goods that costs one unit of the currency of the 'base' country. For example, if the purchasing power parity for food products in Switzerland equals 2.1 relative to the United States, then a basket of food products purchased in Switzerland for CHF 2.1 costs \$1 in the United States. When the exchange rate is 1.4 francs to the dollar, this means that the relative price level of food products in Switzerland is 50 per cent above the level of the USA.

There are two methods to obtain PPPs. The first method is the «expenditure approach», which is based on prices for final consumer and investment products.

One of the weaknesses of this concept is that there are no PPPs for products, which are only used as intermediate inputs in the production process. Another drawback of the expenditure approach arises with international industry comparisons, because the prices used to calculate the PPPs do not reflect producer prices³⁴.

The alternative method is the «industry-of-origin approach», which develops PPPs by industry and sector. The main advantage of industry-specific PPPs are that they correct for the price of intermediate inputs («double deflation») as well as for indirect taxes, subsidies, transport costs and trade margins, so that they are based on ex-factory prices (producer prices). Therefore, in contrast to expenditure approach-PPPs, industry-of-origin-PPPs refer to the concept of value added.

This approach is followed in the IBC database, which contains industry-specific PPPs for the conversion of value added data. The IBC Database considers purchasing power parities (PPPs) for 29 sectors and 10 countries for the year 1997. The PPPs can be used to compare relative price levels across countries and to convert value added and GDP from national currencies to a common currency in order to compare levels of output and productivity by sector. Industry-specific PPPs are constructed for each sector and each country vis-à-vis the United States. The countries include Austria, France, Germany, Ireland, Italy, the Netherlands, Spain, Switzerland, and the United Kingdom. All PPPs are expressed in terms of national currencies to the US dollar. For international comparisons of output and productivity, PPPs are preferable over exchange rates.

Labour / Employment

The European System of Accounts (ESA 1995) introduced a number of measurements of employment in particular:

- employment (= employees and self-employed)
- the number of jobs
- the full-time equivalence

³⁴ First, expenditure PPPs include wholesale and retail margins and transportation costs. When these margins differ between countries they affect the expenditure PPP but not the producer price PPP. Second, expenditure PPPs include indirect taxes and subsidies, which also vary between countries, and are not part of producer prices either. Third, expenditure PPPs include prices of imports, which do not affect producer prices, but exclude export prices, which are part of producer prices.

- the total hours worked

The rationale is to find measurements of employment which match output data and hence allow analysis of productivity. The recommended measurement is the total number of hours worked. The IBC-Database contains two measurements of employment:

- total hours worked in order to analyse productivity
- employment for analysing labour participation
- The concept of employment is generally used by OECD countries. One exception is the USA: employment data by industry are not available. Therefore the concept of jobs has to be used.

Employment

Employment covers all persons, both employees and self-employed, engaged in some productive activity that falls within the production boundary of the system.

Employees (in paid employment)

Employees are all persons who work under contract for another resident institutional unit and receive remuneration. They fall into the following categories:

- persons (manual and non-manual workers, management personnel, domestic staff, people carrying out remunerated productive activity under employment programmes) engaged by an employer under an employment contract
- civil servants and other government employees whose terms and conditions of employment are laid down by public law
- armed forces, consisting of those who have enlisted for both long and short engagements and also conscripts (including conscripts working for civil defence)
- ministers of religion, if they are paid directly by a general government or a non-profit institution
- owners of corporations and quasi-corporations if they work there
- students formally committed to contributing some of their own labour to an enterprise's production process in return for remuneration and (or) education services
- outworkers if there is an explicit agreement that the outworker should be paid on the basis of work done. That is to say, the amount of labour contributed to some production process

- persons employed by temporary employment agencies, who are to be included in the industry of the agency which employs them, and not in the industry of the enterprise they actually work for

Self-employed Persons

Self-employed persons are defined as persons who are the sole or joint owners of the unincorporated enterprises in which they work, excluding unincorporated enterprises classified as quasi-corporations.

Self-employed persons include:

- unpaid family members, including those working in unincorporated enterprises engaged wholly or partly in market production
- outworkers whose income is a function of the value of the output of some production process for which they are responsible, however much or little work they put in
- Workers engaged in production undertaken entirely for their own final consumption or own capital formation, either individually or collectively

Jobs

A job is defined as an explicit or implicit contractual relationship between a person and a resident institutional unit to perform work in return for compensation for a specified period or until further notice. That definition covers both employed and self-employed persons.

Full-time Equivalence

Full-time equivalent employment, which equals the number of full-time equivalent jobs, is defined as total hours worked divided by the average annual number of hours worked in full-time jobs within the economic territory.

Total Hours Worked (= Work Volume)

Total hours worked represent the aggregate number of hours actually worked by an employed or self-employed person during the accounting period, when their output is within the production boundary.

Total hours actually worked include:

- hours actually worked during normal working times
- hours worked in addition to those worked during normal working times, and generally paid at higher than normal rates (overtime)

- time spent at the place of work on tasks such as site preparation, repair and maintenance work, preparation and cleaning of tools, and making-out receipts and invoices, keeping time sheets and writing-up other reports
- time corresponding to short rest periods at the work place, including refreshment breaks
- Hours actually worked do not include:
 - hours which are paid but not worked, such as paid annual leave, public holidays, or sick-leave
 - meal breaks
 - time spent travelling between home and the work place when paid for (construction workers)

Hours Worked per Person in Employment

Average annual hours actually worked per person in employment is defined as the total number of hours worked over the year divided by the average number of people in employment.

Productivity

Hourly Productivity (Output per Hour Worked or Man-hour Productivity). In the IBC Report hourly productivity is calculated as real value added divided by the total number of hours worked over the year. Hourly productivity therefore is a measurement of labour productivity.

Labour Costs

Labour Costs

For most sectors of the economy labour costs contribute substantially to the overall costs. Firms' decisions about the location for their production are influenced to a great extent by regional differences in the expenses for labour. Therefore, the latter are an important factor when measuring international competitiveness.

Labour costs consist of wages and ancillary costs. Direct wages and direct ancillary costs sum up to gross wages. Adding indirect additional costs again yields the total cost of labour. The IBC Database uses data on labour costs that have been raised by the national statistical offices. Unfortunately, surveys on labour costs are not conducted very frequently. In fact, in most countries labour costs have been collected only twice within the last decade. For this reason, data on gross wages, which are available on an annual basis, are used to extrapolate the labour costs. For recent years, when wages are not available due to a considerable time lag in reporting, wage indices developed by Oxford Economic Forecasting (OEF) for their international industrial model are utilised. In this way, a continuous time series is constructed.

Unit Labour Costs

Unit labour costs are defined as labour costs per output unit. They are calculated as hourly labour costs divided by hourly productivity (which is calculated as annual real value added divided by the total number of hours worked p.a.).

8.5 The Location Factor indicators of the IBC Database

The IBC database does not only include data covering the economic performance of regions. Also it provides an overview on the position of the regions regarding several location factors. These are organised in separate so-called Modules. The following introduces the modules and provides an overview on the information available for the econometric analysis. In some cases, the data was collected especially for the project and have not been available before. They are described here as well, as they will be part of the IBC data in future.

Innovation

The ability to innovate (i.e. access to knowledge) is a central element of a business location's attractiveness. Textbooks on economic theory stress the close relationship between the development of the knowledge base and the creation of wealth. The results of the company surveys carried out repeatedly by BAK Basel Economics within the framework of the International Benchmark Report since 1995 have also underscored the importance attached to innovativeness by representatives of enterprises e.g. BAK (2003b).

For these reasons, BAK conceived and implemented the initial stage of the «Innovation Module». The studies conducted during the first phase (2000-2001) confirmed the advisability of following the example set by the Massachusetts Technology Collaborative [Massachusetts Technology Collaborative (2002)] in trying to describe and analyse the innovative capabilities of individual regions. This approach addresses the complex phenomenon of the innovative capacities of regional economies by investigating the specific subjects of innovation results, innovation resources and the innovation process itself. Studies for Europe carried out in the past failed to venture below the national level e.g. OECD (2000, 2002a, 2003) and EU Commission (2002). The IBC module on innovations started to fill this gap for Europe on a regional level.

The module provides data on a wide range of innovation indicators. These include among others innovation resources like human capital, quality and quantity of the production of human capital, R & D expenditure (public and private), venture capital and communication infrastructure. Furthermore, there are indicators for the innovation processes like patents, bibliometric indicators and company founding.

Data on the educational structure of the workforce is taken from Eurostat (Labour Force Survey), BFS (Volkszählung 2000 and Schweizerische Arbeitskräfteerhebung) as well as from the U.S. Census Bureau. Data on expenditures on R & D originates from the BFS and Eurostat (Statistics on Science and Technology). The research quality is measured by using the 'Academic Ranking of World Universities' (Shanghai Jiao Tong University's).

Taxation

Taxation of companies and highly qualified manpower plays a very important role in the competition between regions as business locations and is now even being intensified by globalisation. In order to underscore subjective estimates of the tax burdens of different business locations with objective data, BAK Basel Economics is conducting a study carried out by the ZEW (Zentrum für Europäische Wirtschaftsforschung, Mannheim).

The objective of this IBC module consists in compiling and comparing indicators for the regions and countries. The module is divided into two parts: Company taxation and tax burdens on highly qualified manpower.

Company taxation:

The method applied in this module is the Devereux-Griffith Approach (DG Approach). It calculates «effective average tax burdens» in addition to «effective marginal tax burdens» (i.e., the tax burdens borne by capital projects whose return on investment is just high enough to be deemed worthwhile to the investors). The effective average tax burdens are defined as the tax burdens on projects that yield returns greater than the minimum return. They take a set of different kinds of investment goods (e.g. machines, industrial buildings, financial assets) as well as different ways to finance the investment (e.g. profits, shares, credits) into account. National, regional and local taxes are included in the calculation.

Tax burdens on highly qualified manpower:

A traditional way of comparing the fiscal attractiveness of regions competing with one another internationally is to concentrate on the tax burdens borne by mobile capital and mobile companies. Lately this approach has been broadened by paying increasing attention to the mobility of employees, especially those with high and highest qualifications. Of course local governments like to see such highly qualified people moving in, for one thing because of their lack of need for social support

services. Several surveys have shown that companies competing for the best-qualified job applicants are also very interested in the level of taxation and other charges these potential employees would be faced with at the location in question. In the module the average tax burden on atypical highly qualified employee is calculated, taking into account not only all direct taxes on wage and other benefits, but also social security contributions in as far as there is no market identical return. This can be calculated for different level of available net income (50,000, 100,000, 200,000 EURO), different family settings (single, married with 2 children), or different pay-packets (normal, old age oriented, incentive oriented). Further, the assumption can be varied (pensions are completely market equivalent; all social security contributions are market equivalent).

Accessibility

Transport infrastructure plays an important role in the development of regions. According to economic theory, regions with a well established access to markets are more productive, more competitive, and hence basically more successful than regions with less developed access possibilities. Economical reasons for this are lower transport and time costs enterprises and individuals have to bear in easily accessible regions. Such lower costs allow a division of labour between regions and thus regional specialisation, which entails economies of scale and benefits of specialisation. In an increasingly globalised world the part a region can take in economic growth depends mainly on its Accessibility. This is why the improvement of regional Accessibility has a high priority in the European Regional Development Fund (ERDF), one of the four structural funds of the EU.

Accessibility is a complex term. Before specifying indicators it has to be clear what kind of Accessibility is going to be measured. Accessibility analysis works on a combination of travel costs with structural data of locations. Two components of measures are necessary:

- Activity of regions (population, places of work, GDP etc.)
- Impedance (geographical distance, travel cost, travel time etc.)

Accessibility values are calculated from activities and impedances according to special functions.

- Specifications Focus on Accessibility requirements of companies and institutions

- Access to input and goods markets (activity)
- Only Accessibility of persons
- Travel time as impedance measure
- Modes: road, rail and air

Separate view on intraregional, interregional and intercontinental Accessibility is necessary. An indicator for intraregional Accessibility could be the highly qualified manpower within 60 minutes commuting distance. Furthermore, infrastructure measures like bus stops or measuring actual average travel times can be used. Up to today data could only be calculated for a few model regions and these indicators can not be used in the econometric part of the project.

The interregional indicator focuses on the access to the European market, to clients, suppliers, partners, and advanced business services. Activity values are economic potential, level of advanced producer services, level of research, prominence as conference cities, etc. Impedance values are calculated on the basis of the fastest daily connection using all modes.

The focus in intercontinental Accessibility is on the worldwide contacts within the corporate group, the cooperation with partners, the Accessibility of trade fairs and conferences, but also the access to worldwide clients and suppliers. Activity values of destination world cities are based on economic activity, density of headquarters, density of multinational companies and organisations, prominence as conference cities etc. The calculation of total travel time takes into account access time to the inter-continental hub and the time spent on the hub.

Regulation

What is the optimal level of public regulation? Regulation corrects market failures and compensates for externalities. On the other hand regulation is costly. There are direct costs like administration and controlling. There are indirect costs as well, e.g. not market-conform incentives or government failure. The optimal level of regulation can not be determined theoretically; empirical studies have to be used to answer this question at least partly.

Regulations work through many channels of an economic system, and the relationship between regulation and growth is very complex. Due to data availability and the wider focus of the complete study the indicators used in this

project had to be limited to two, one for product market regulation and one for employment protection.

The indicators are based on the OECD regulation database. The two indicators used are themselves a summary of a wide range of regulation indicators collected by the OECD, weighted according to the results of a factor analysis. The individual indicators include among others economic regulation concerning market access, the use of inputs, output choices, pricing and international trade and investment; administrative regulation i.e. the interface between government agencies and economic agents including means for communicating regulatory requirements to the public as well as compliance procedures; and employment protection legislation (EPL) for regular as well as temporary employment contracts.

The OECD-regulation database contains indicators for the years 1990 (Labour Market Regulation), 1998 (Product and Labour Market Regulation) and 2003 (Product Market Regulation). To add variation in the time dimension, OECD time series information on the product market regulation in several industries have been used as well as data from the Frasier Institute (the so called CATO-Indices) to built up a time series for labour market regulation. The CATO regulation index follows an approach similar to the OECD, and a cross section comparison yields similar country ratings.

Population

Population and population growth is often related to economic development. Although the causality of the relation is not clear, it is useful to take population into account when analysing economic performance. In the IBC a variety of population data are available. Separate information is included on gender and age. Age is split in groups according to possible labour market participation: From birth to age 15, from 16 to 64, 65 and older. As the geographical size of the regions is included in the database as well, population density can be calculated, for the complete population as well as for population parts according to gender and age group.