BAK
economic intelligence

Friuli-Venezia Giulia

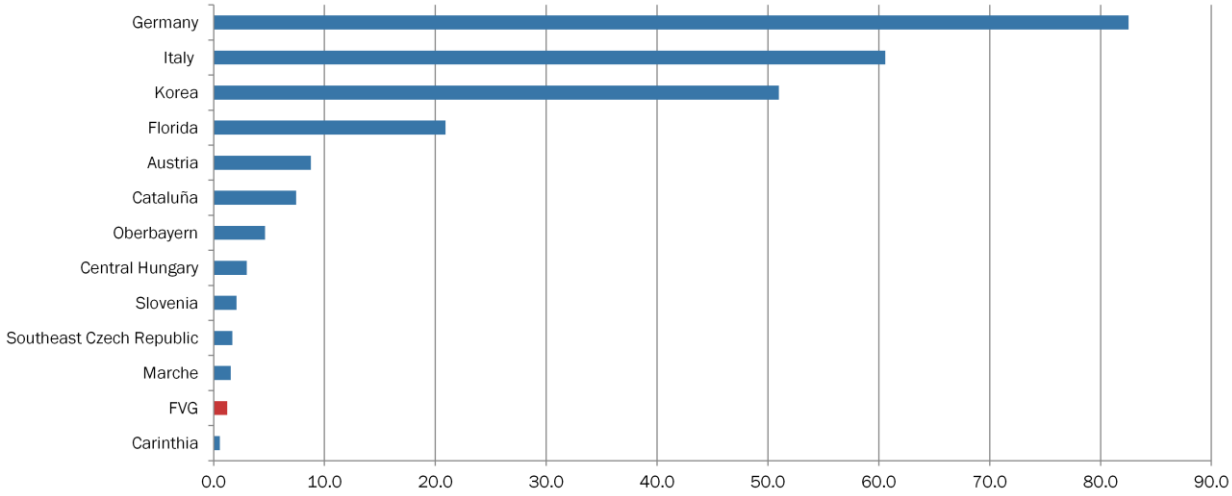
REA Chart Set

BAK Regional Economic Analysis

Content

General Information

Population



Note in Million persons, 2017, Western Europe and US is not depicted in the graph due to large size

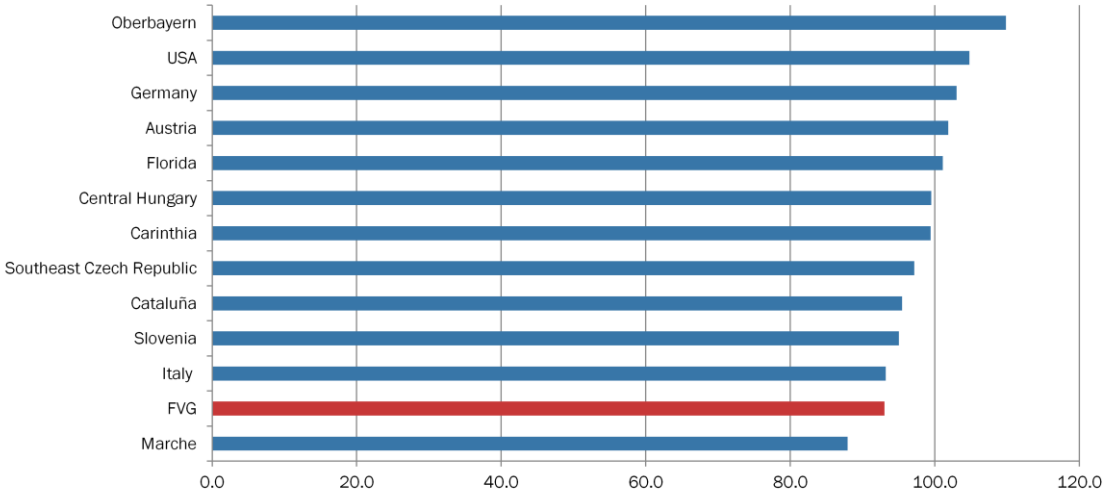
Source BAK Economics

Methodological Notes
Population

Population by region is defined by the number of inhabitants (citizens or foreigners) living in the defined regions. Data refer to the beginning of the year, except for Korea (year average) and the United States (from the 1st of July).

Economic Potential

BAK Economic Potential Index



Note Index, WE15 & US = 100, RED 2018

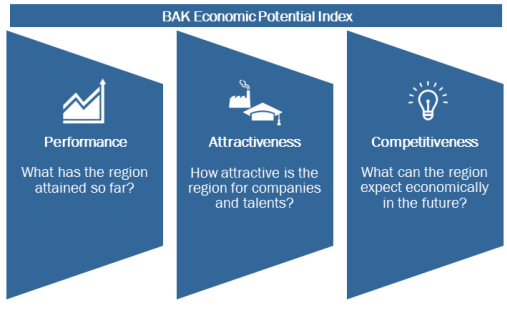
Source BAK Economics

Methodological Notes
BAK Economic Potential Index

The BAK Economic Potential Index – comprising *Performance*, *Attractiveness* and *Competitiveness* – offers a balanced and consistent set of indices for these three dimensions. It comprises economic performance indicators such as real GDP per capita or job growth, location factors such as the tax burden on companies and employees or accessibility, as well as productivity and industry data to measure the competitiveness of the regions' economic structures.

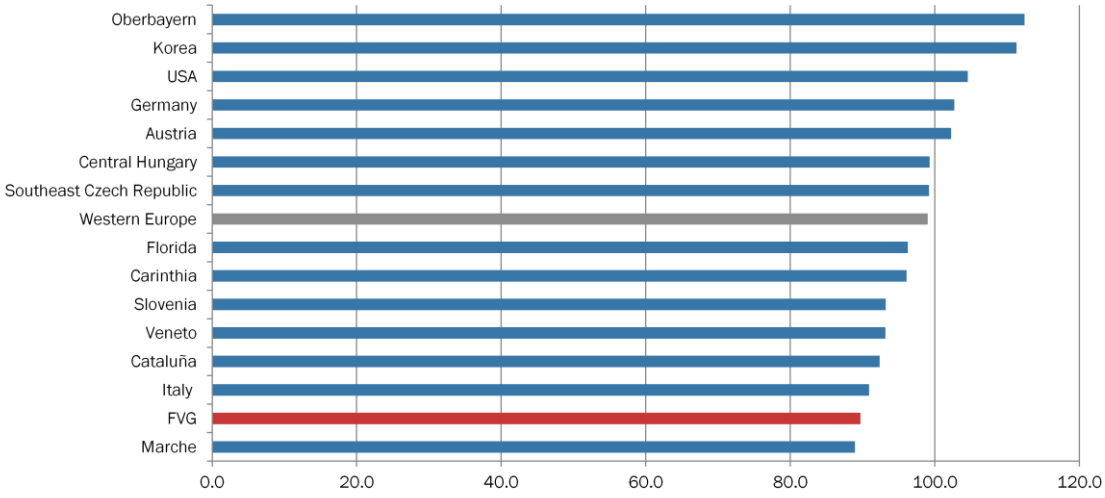
The Performance Index measures a region's past economic growth and current wealth. It combines an assessment of the level of economic activity as well as of the dynamics of the economy. The Attractiveness Index assesses the future potential of a region by looking at the attractiveness of the location for companies as well as for highly qualified individuals. It reflects the ability of a region to attract and retain companies as well as human capital. The Competitiveness Index also addresses future prospects by estimating the competitiveness of a region's export sectors as well as its economic growth of tomorrow, given the economic structure visible today.

The average of all Territorial Level 2 (TL2) regions in Western Europe and the US is set to 100 and the standard deviation of the variable of the same set is set to 10. Therefore, an index value of 110 means a region's economic potential is one standard deviation better than the average of all Western European and US TL2 regions. An index of 80 means it is two standard deviations below the average.



Economic Performance

BAK Performance Index



Note Index, WE15 & US = 100, RED 2018

Source BAK Economics

Methodological Notes
BAK Performance Index

The *Performance Index* covers one aspect of the economic potential of a region by summarizing its economic performance in recent history. It combines measures of the level of its economic activity as well as the dynamics of its economy.

The indicator utilized to capture the level part of the index is straight forward: real GDP per capita (in US PPP). For the growth part, a 10 years' average growth is used which reflects structural developments rather than reflecting effects of the economic cycle. Yet it still puts enough focus on recent developments. Two indicators are used: GDP (the most common indicator for economic growth) as well as employment (creating jobs is probably the most important task of a regional economic policy).

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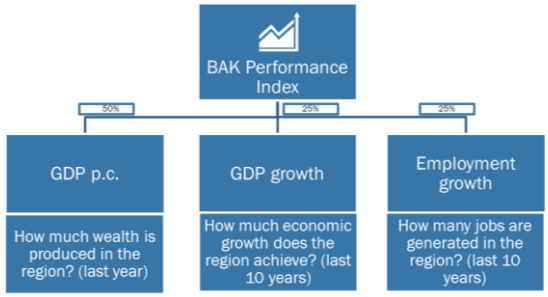
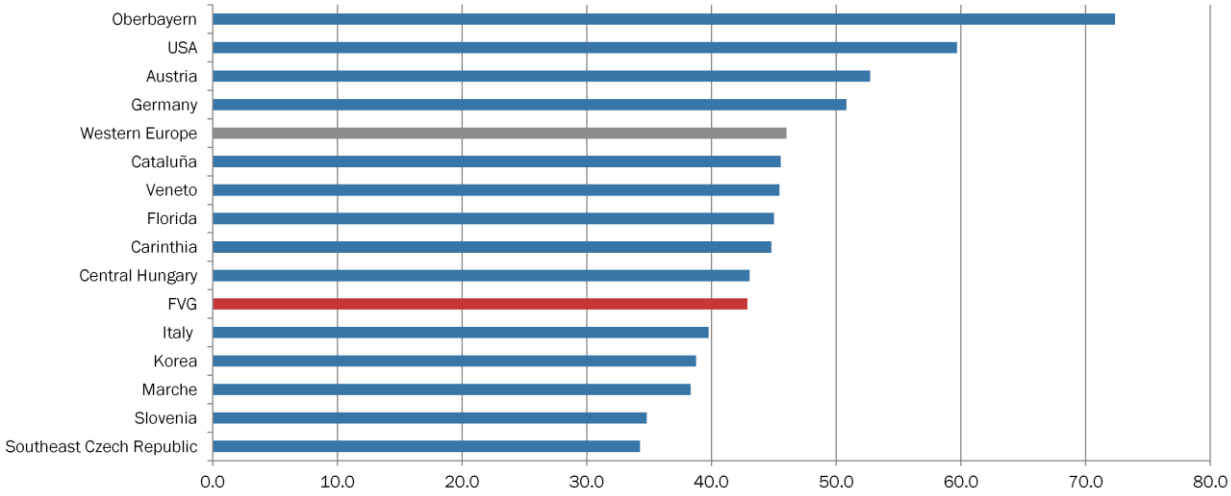


Economic Performance

GDP per Capita



Note In 1'000 USD (at current prices and exchange rates in PPP), 2017

Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
GDP per Capita

Gross Domestic Product (GDP) per capita is a core indicator of economic performance and measures a region's level of prosperity. A region's GDP related to its population size allows comparisons between regions of different sizes.

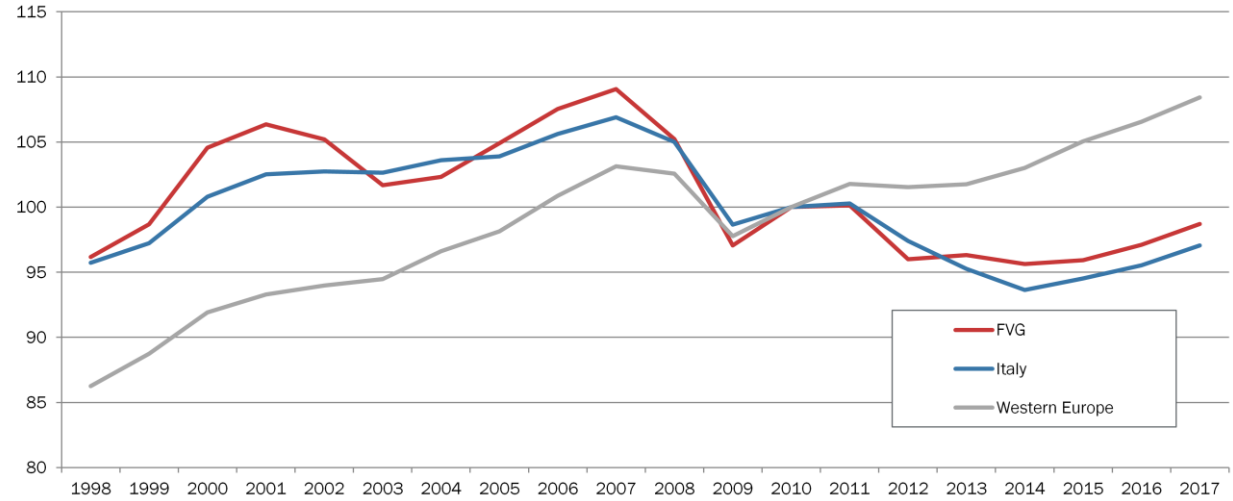
Nominal Gross Domestic Product is the monetary value of all the finished goods and services produced at market prices within a region's borders in a year. It is calculated as the difference between the monetary values of production and intermediate inputs. Then, the GDP is divided by the total population for the same year.

Current prices and exchange rates
In order to compare data from different currency regions for individual years, GDP is measured in current prices (nominal) and exchange rates (annual average exchange rates).

PPP (Purchasing Power Parity)
PPP correction is used to equal the exchange rates between two countries to the ratio of the currencies' respective purchasing power. PPP is an exchange rate valuing the different purchasing power of the currencies instead of financial market exchange rates, which fluctuate massively and are vulnerable to speculation.

Economic Performance

Growth of real GDP per Capita



Note Index, 2010 = 100 (at prices of preceding year)

Source BAK Economics, OECD, National Statistical Offices, OEF

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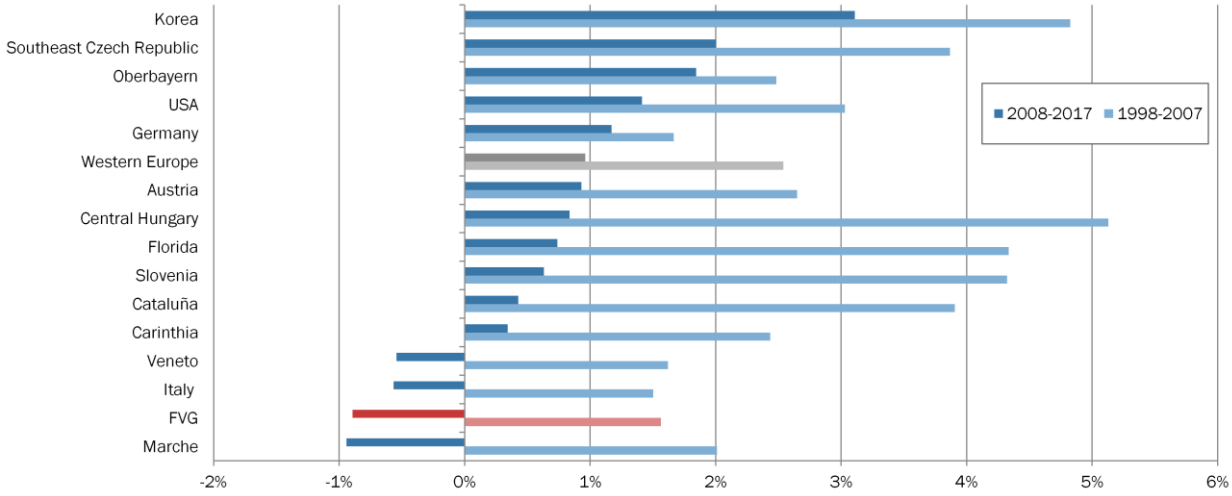
Methodological Notes
Real GDP Growth

Economic growth expressed in real terms measures the economic dynamics of a region and indicates how the region's prosperity evolves over time. The graph displays average annual growth rates.

Real GDP equals the deflated nominal GDP. It is calculated using chained volumes, i.e. the GDP level of year *t* is measured at prices of the previous year (*t-1*).

Economic Performance

Real GDP Growth



Note In % p.a. (at prices of preceeding year)

Source BAK Economics, OECD, National Statistical Offices, OEF

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Methodological Notes
Real GDP Growth

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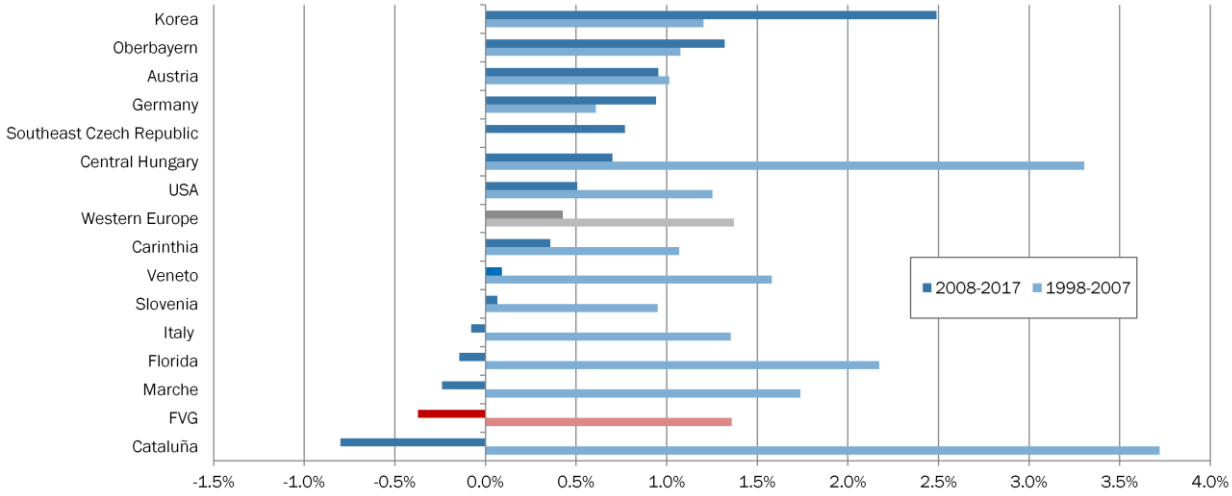
Economic Performance

Employment Growth



Note In % p.a.

Source BAK Economics, OECD, National Statistical Offices, OEF

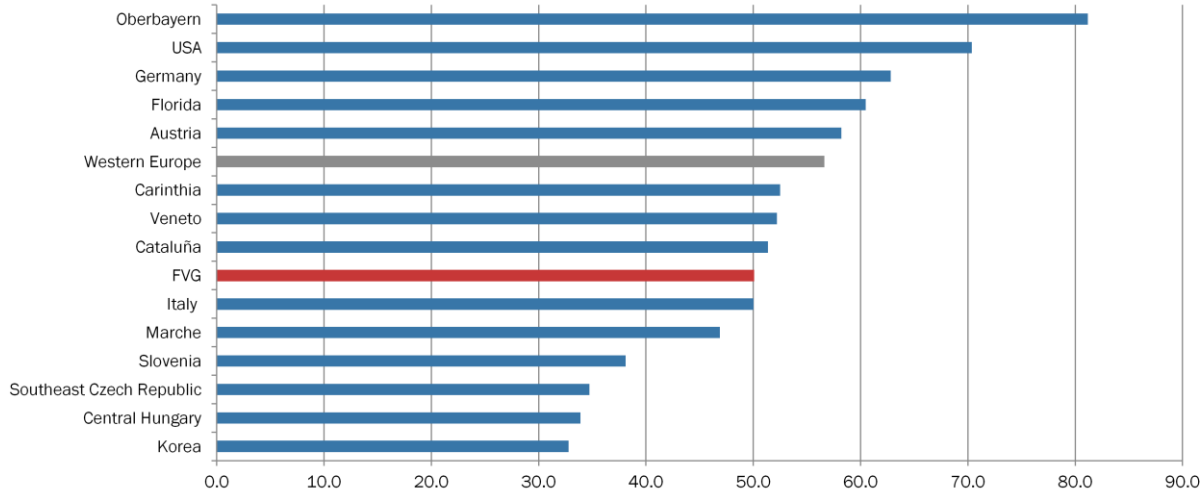
Methodological Notes
Employment Growth

Economic performance of a region can be measured by either GDP growth or employment growth. A region is successful whenever an increase in production creates new jobs.

Total employment includes all people engaged in domestic production (employees and self-employed) in the region, regardless of whether they are residents of the region or not.

Economic Performance

Hourly Productivity



Note In USD per hour worked (at current prices and exchange rates, PPP corrected), 2017

Source BAK Economics, OECD, National Statistical Offices, OEF

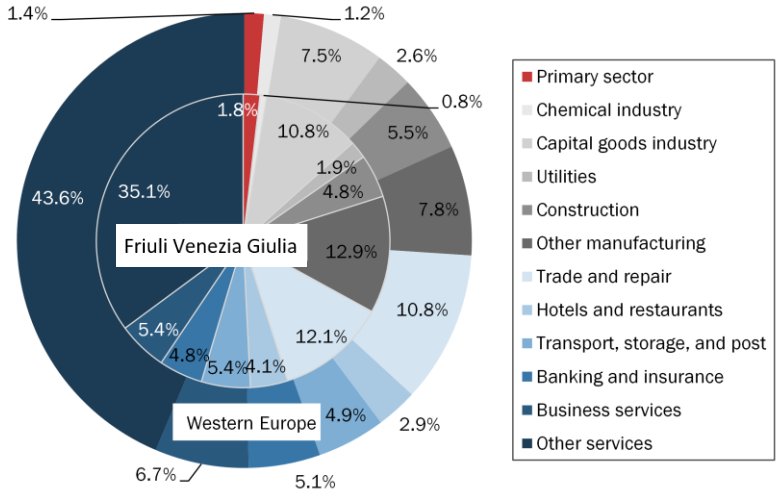
Methodological Notes
Hourly Productivity

Productivity is a key figure for a region since it captures the international competitiveness of the region. Productivity is the ratio between input (production factors) and output (goods and services produced). The key indicator is the hourly productivity, which measures how much Gross Value Added (GVA) is produced per hour worked.

Hourly productivity is defined by the nominal gross value added, divided by the effective total number of hours worked.

Economic Structure

Economic Structure



Note	Total share of nominal gross value added in USD, 2017
Source	BAK Economics, OECD, National Statistical Offices, OEF

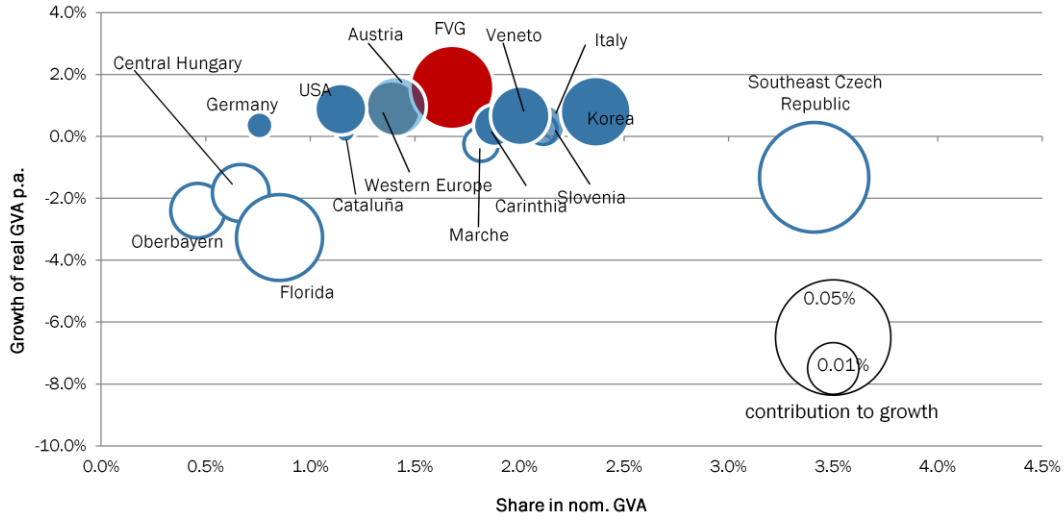
Methodological Notes
Economic Structure

The economic structure of an economy identifies the key regional sectors by showing the share of selected industries (or aggregates of industries) of the total nominal gross value added of the economy.

Nominal Gross Value Added (GVA) differs from GDP in the sense that it is not adjusted for any kind of subsidies or taxes. Also, it is reported at the industry level. Nominal GVA is calculated at current prices and exchange rates in USD.

Industries

Growth Contribution: Agriculture, Forestry and Fishing



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
Source	BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Agriculture, Forestry and Fishing (A)

This chart presents the growth contribution of a particular industry (or a particular aggregate of industries) for the benchmarking regions. The graph is based on gross value added. The evaluation of relevant region-specific industries is based on data as well as on expert knowledge.

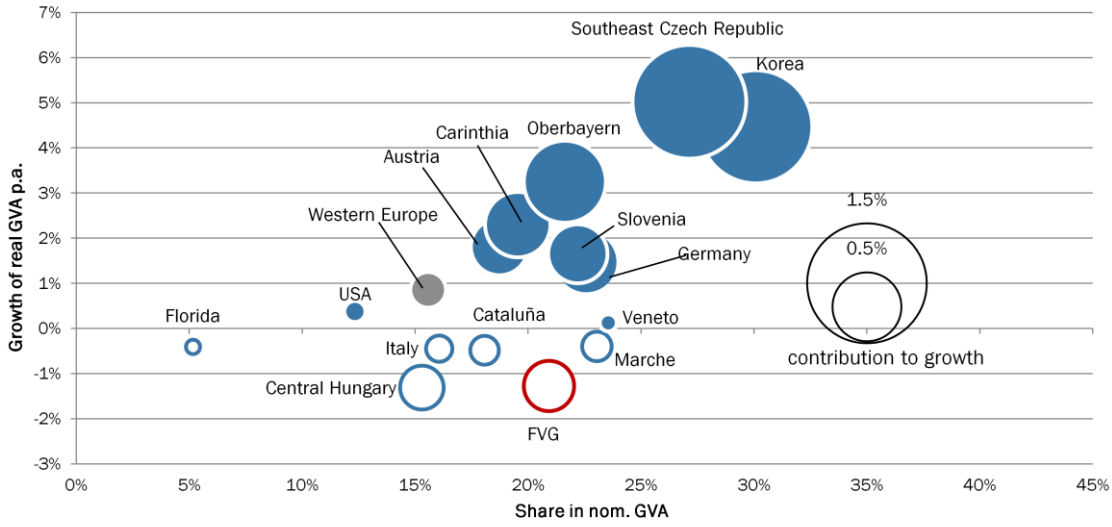
The x-axis conveys information on the share (in percent) and y-axis reflects the average annual growth (in percentage points) of the specific industry. Therefore, the growth contribution of a sector increases when moving from the lower left corner towards the right and/or upwards. As the relationship is non-linear, the growth contribution is also given in the graph: the size of the bubbles reflects the growth contribution.

The contribution of the industry to the growth of a region is measured by its weight in the total economy as well as its respective growth rate. Therefore, a large contribution to growth will be the result of a relatively high share undergoing moderate growth, or alternatively, a relatively small share with a more dynamic development.

For example, consider a sector with a 20% share of the regional economy and a 2% average annual growth rate between 2007 and 2017. This would mean that, on an annual basis, this sector contributed on average 0.4 percentage points to the growth rate of the region's economy between 2007 and 2017. Or, in other words, if this particular sector did not exist, the annual economic growth rate would have been 0.4 percentage points lower.

Industries

Growth Contribution: Manufacturing



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
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Methodological Notes
Contribution of Manufacturing (C)

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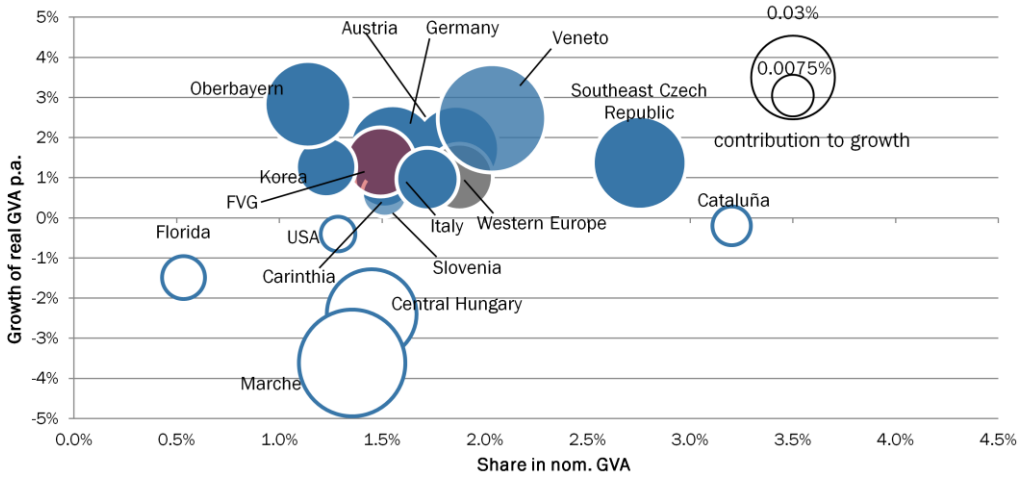
Industries

Growth Contribution: Manufacturing of Food Products and Beverages



Note Total share of nominal gross value added and real gross value added growth, 2007–2017,
Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of IManufacturing of Food Products and Beverages (C101-C110)

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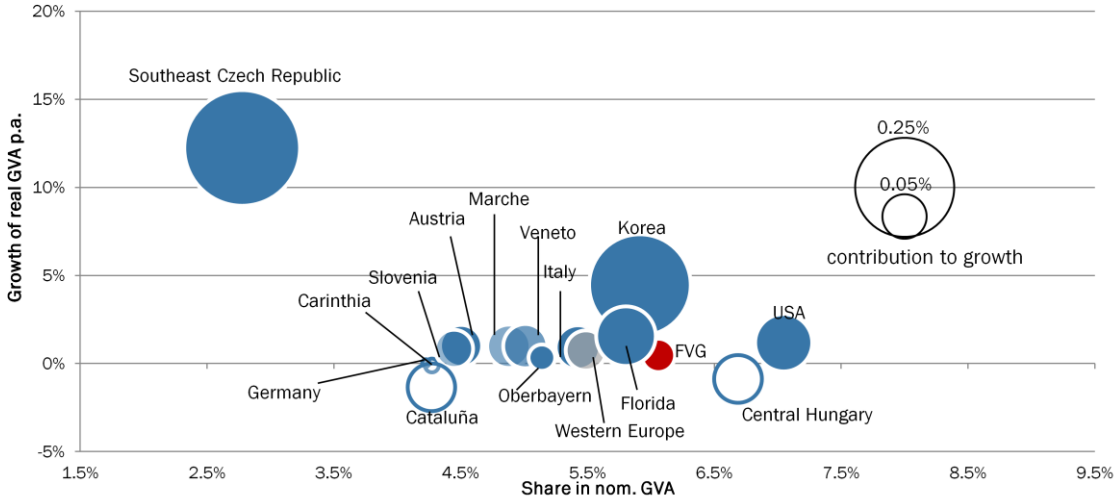
Industries

Growth Contribution: Financial and Insurance Activities



Note Total share of nominal gross value added and real gross value added growth, 2007–2017

Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Financial and Insurance Activities (K)

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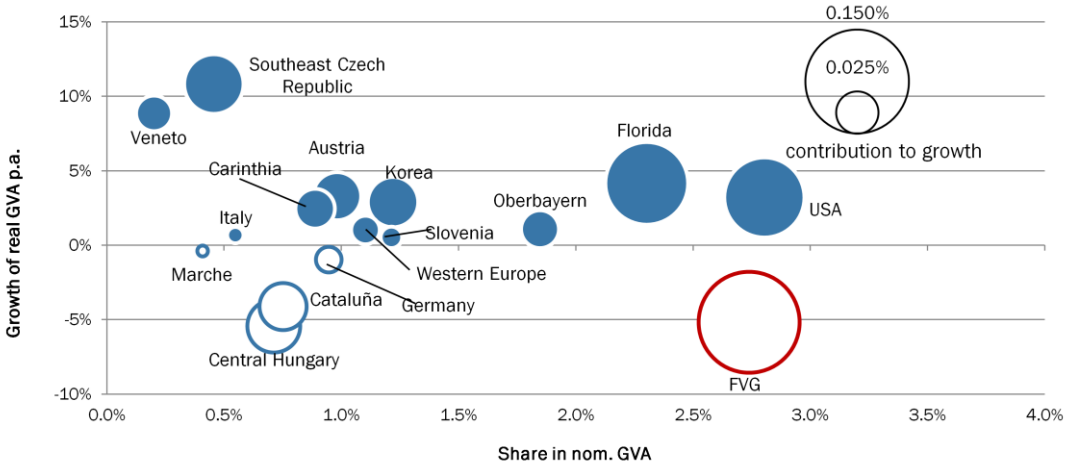
Industries

Growth Contribution: Insurance, Reinsurance and Pension Funds



Note Total share of nominal gross value added and real gross value added growth, 2007–2017
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Methodological Notes
Contribution of IManufacturing of Food Products and Beverages (K 65)

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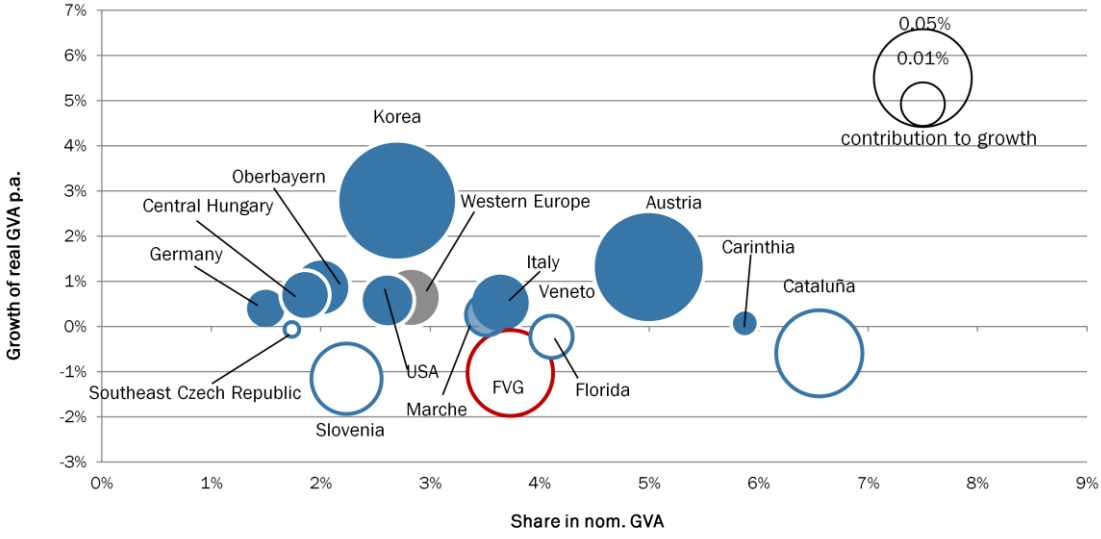
Industries

Growth Contribution: Accommodation and Food Service Activities



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
Source	BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Accommodation and Food and Service Activities (I55_I56)

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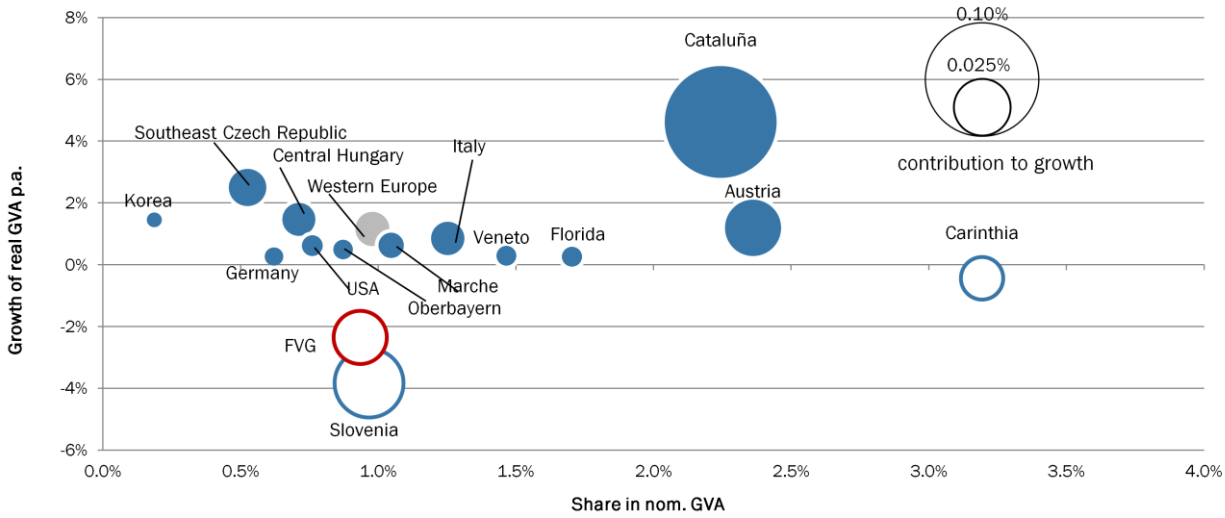
Industries

Growth Contribution: Accommodation



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
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Methodological Notes
Contribution of Accommodation (I55)

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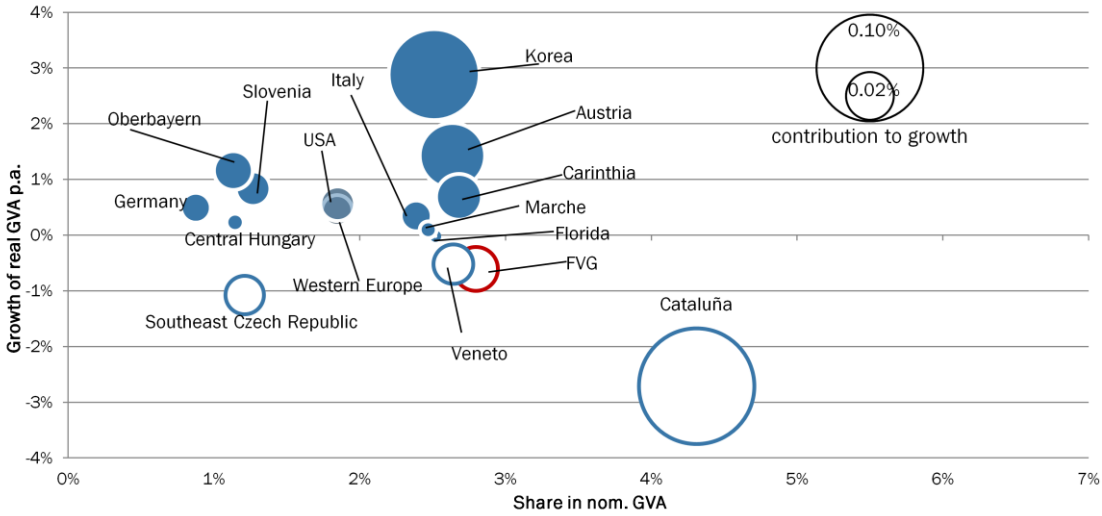
Industries

Growth Contribution: Food and beverage service activities



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
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Methodological Notes
Contribution of Industries Food and beverage service activities (I56)

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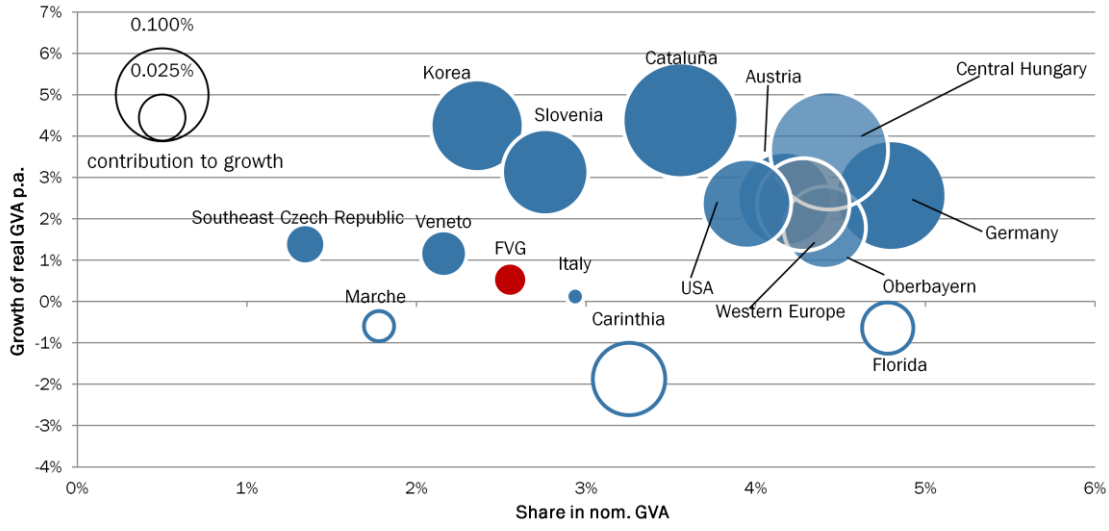
Industries

Growth Contribution: Administrative and Support Service Activities



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
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Methodological Notes
Contribution of Administrative and Support Service Activities (N)

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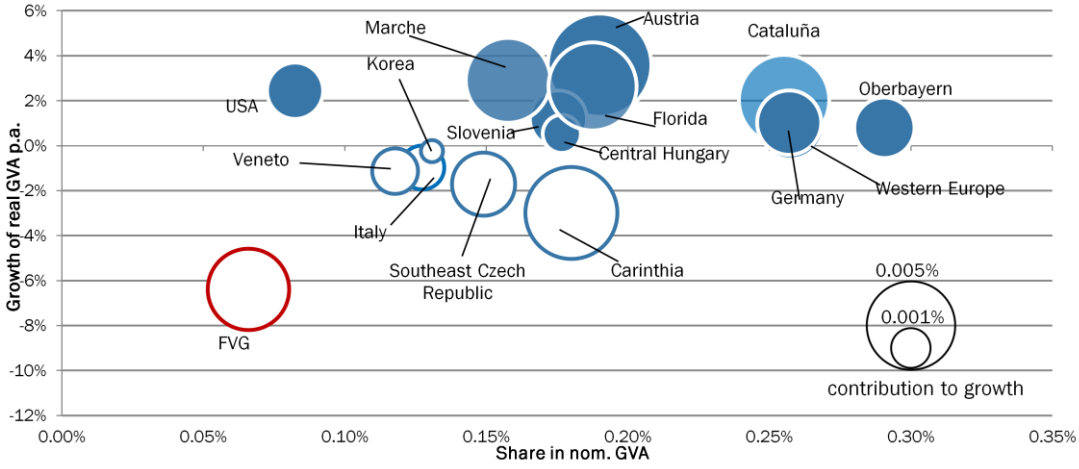
Industries

Growth Contribution: Travel agency, tour operator, reservation service and related activities



Note	Total share of nominal gross value added and real gross value added growth, 2007–2017
Source	BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Travel agency, tour operator, reservation service and related activities (N79)

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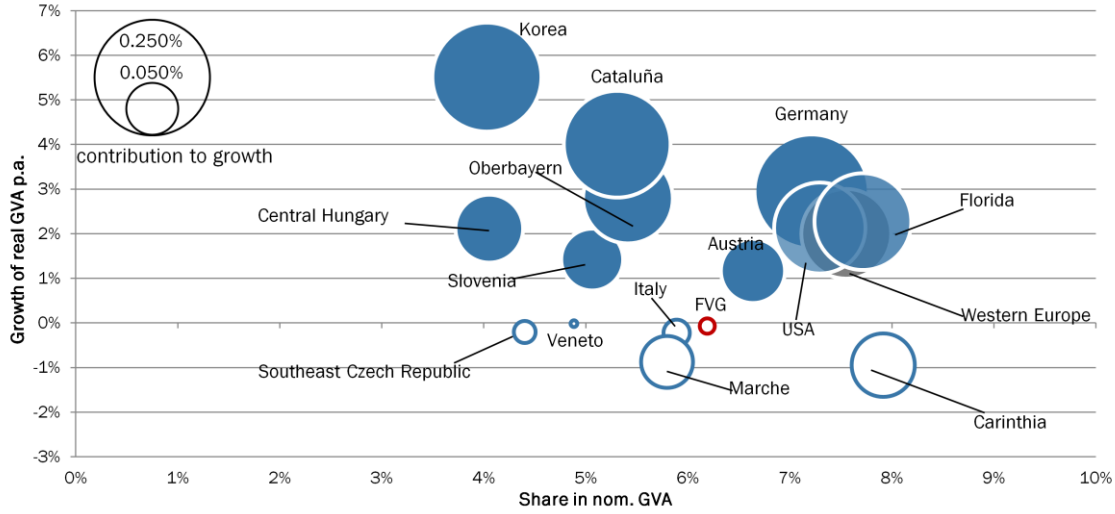
Industries

Growth Contribution: Human health and social work activities



Note Total share of nominal gross value added and real gross value added growth, 2007–2017

Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of: Human health and social work activities (Q)

This chart presents the growth contribution of a particular industry (or a particular aggregate of industries) for the benchmarking regions. The graph is based on gross value added. The evaluation of relevant region-specific industries is based on data as well as on expert knowledge.

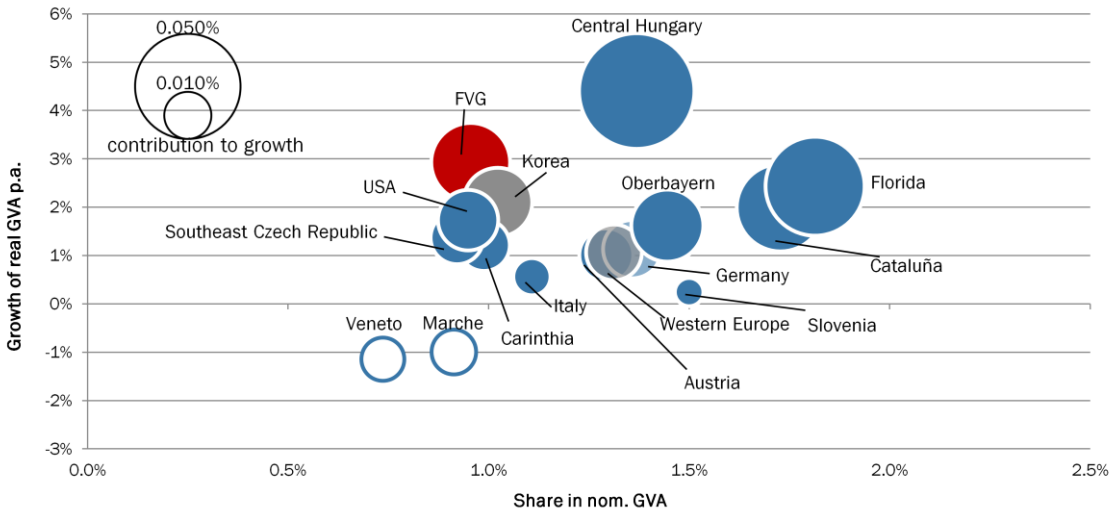
The x-axis conveys information on the share (in percent) and y-axis reflects the average annual growth (in percentage points) of the specific indutry. Therefore, the growth contribution of a sector increases when moving from the lower left corner towards the right and/or upwards. As the relationship is non-linear, the growth contribution is also given in the graph: the size of the bubbles reflects the growth contribution.

The contribution of the industry to the growth of a region is measured by its weight in the total economy as well as its respective growth rate. Therefore, a large contribution to growth will be the result of a relatively high share undergoing moderate growth, or alternatively, a relatively small share with a more dynamic development.

For example, consider a sector with a 20% share of the regional economy and a 2% average annual growth rate between 2007 and 2017. This would mean that, on an annual basis, this sector contributed on average 0.4 percentage points to the growth rate of the region's economy between 2007 and 2017. Or, in other words, if this particular sector did not exist, the annual economic growth rate would have been 0.4 percentage points lower.

Industries

Growth Contribution: Arts, Entertainment and Recreation



Note Total share of nominal gross value added and real gross value added growth, 2007–2017

Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Arts, Entertainment and Recreation (R90_R92_R93)

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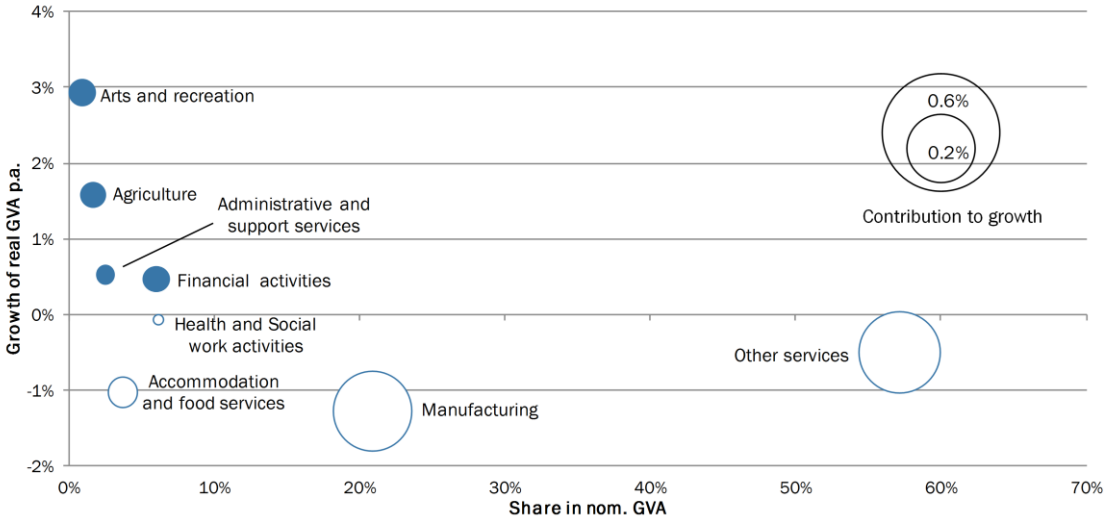
Industries

Contribution of Industries Friuli-Venezia Giulia



Note Total share of nominal gross value added and real gross value added growth, 2007–2017

Source BAK Economics, OECD, National Statistical Offices, OEF

Methodological Notes
Contribution of Industries

This graph analyses the growth contribution of industries (or aggregates of industries) in the region. The graph is based on gross value added.

The contribution of a sector (industry, firm, region, etc.) to the growth of an economy (sector, region, country, etc.) is measured by its weight in the total economy as well as its respective growth rate. Therefore, a large contribution to growth will be the result of a relatively high share undergoing moderate growth, or alternatively, a relatively small share with a more dynamic development.

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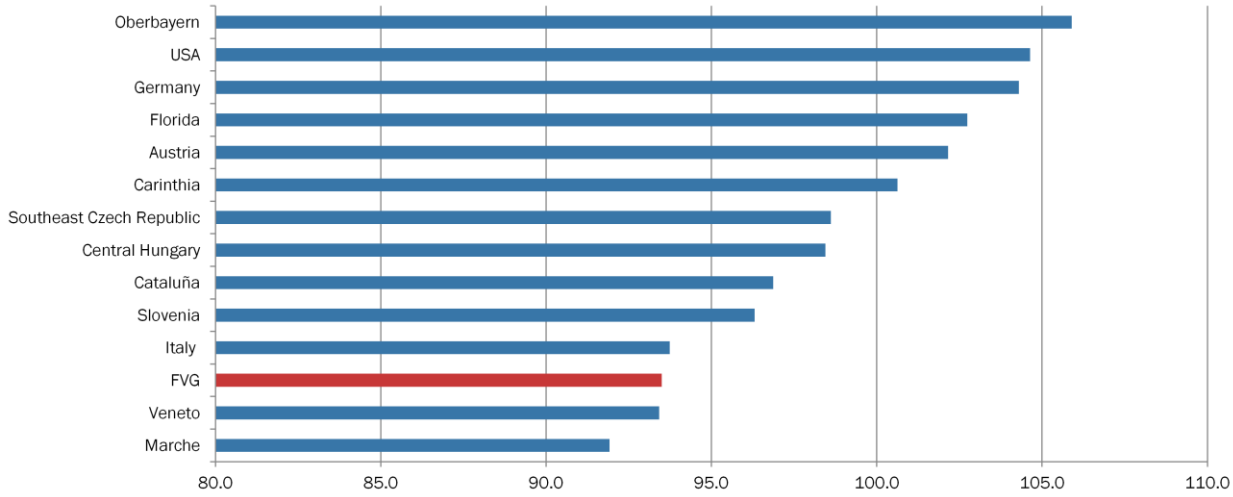
Regional Attractiveness

BAK Attractiveness Index



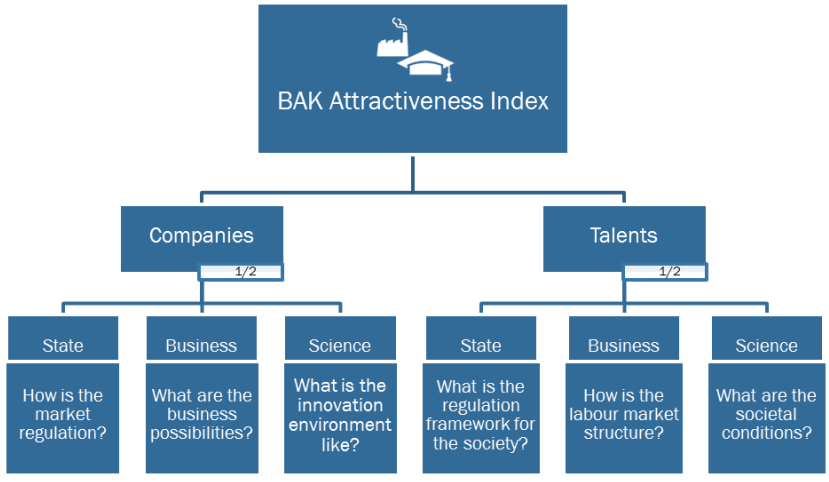
Note Index, WE15 & US = 100, RED 2018

Source BAK Economics

Methodological Notes
BAK Attractiveness Index

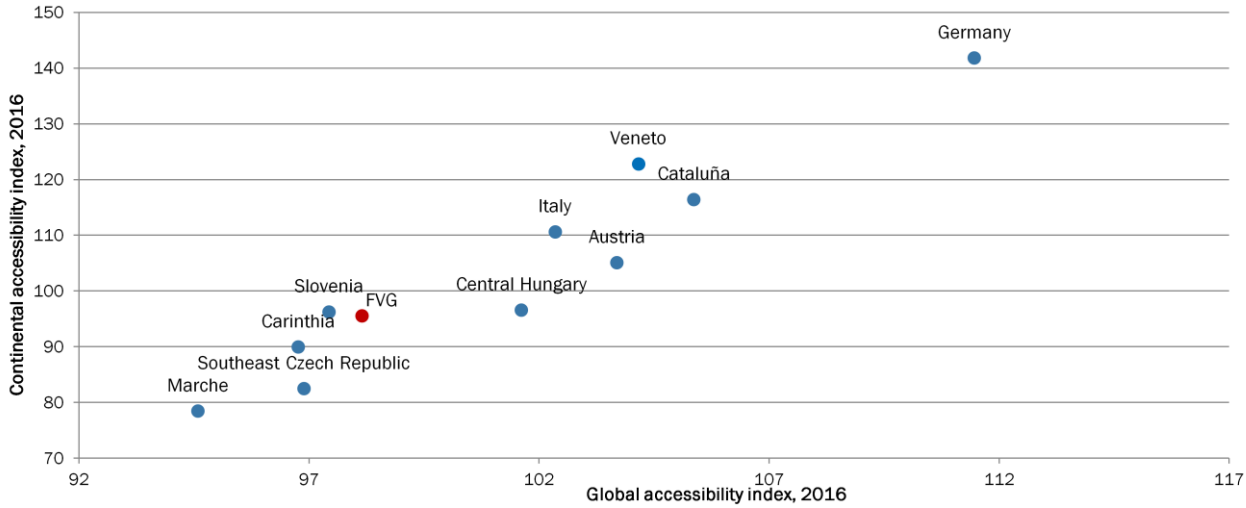
The *Attractiveness Index* reflects the ability of a region to attract and retain companies as well as human capital. In a globalized economy, it is crucial for a region's competitiveness to attract these resources. However, attractiveness cannot be measured directly. Instead, the BAK Regional Economic Database (RED) provides various indicators of different topics which, together, illustrate the attractiveness of a region.

The average of all Territorial Level 2 (TL2) regions in Western Europe and the US is set to 100. The standard deviation of the variable of the same set is set to 10. Therefore, an index value of 110 means a region's economic potential is one standard deviation better than the average of all Western European and US TL2 regions. An index of 80 means it is two standard deviations below the average.



Regional Attractiveness

Global and Continental Accessibility



Note Index (average accessibility of regions 2002 = 100)

Source BAK Economics, IVT

bak-economics.com 26

Methodological Notes
Accessibility

The accessibility of a region is determined by two factors: geographical location and infrastructure. While the geographical location cannot be changed, improving connectivity should be a key policy aim. A region's accessibility is a key factor in a globalised economy.

The concept of accessibility used here focuses on travel times and frequency for interregional or international business travels. The indicator reflects a region's complete potential. This implies that all other regions are included without any time limitations. Nevertheless, it weights the different destinations regarding the travel time (with a non-linear function) and the GDP of the destination.

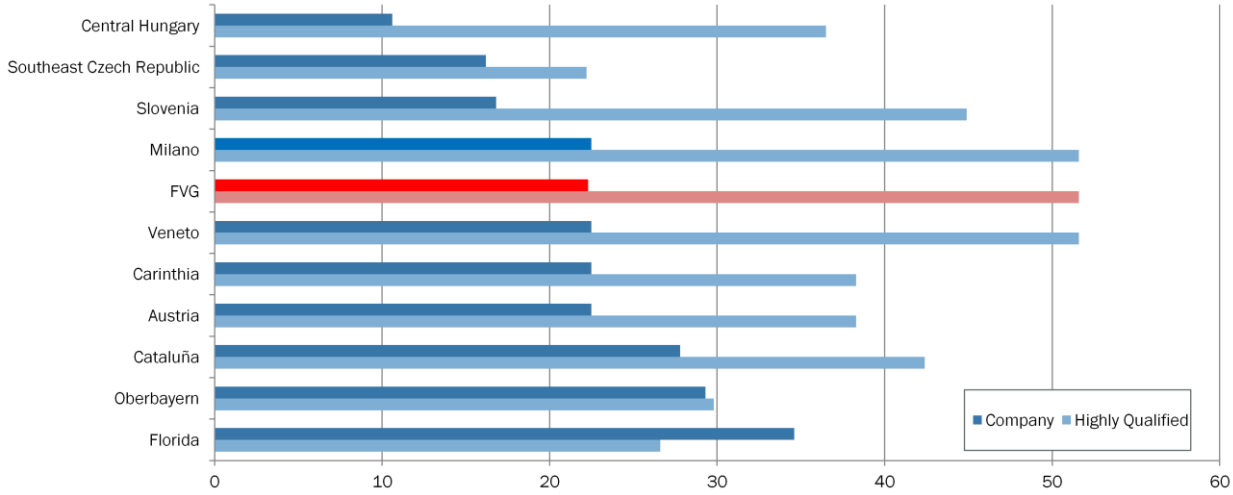
Global accessibility (index, sample average 2002=100)
Global accessibility reflects the outbound accessibility from a region to locations in the rest of the world outside of Europe respectively from US regions to locations outside of the US.

Continental accessibility (index, sample average 2002=100)
Continental accessibility is measured by calculating travel times from and to almost all big European cities by train, by car and by inter-European flights. The fastest modus or the fastest combination of modes is used for each individual connection.

The regions accessibility reflect the accessibility of the center/most populous city of the region.

Regional Attractiveness

Taxation of Companies and Highly Qualified Manpower



Note Average tax burden of companies and average tax rate for a highly qualified employee in %, 2017, Cataluña =Madrid, Oberbayern=Munich, Central Hungary=Hungary

Source BAK Economics, ZEW

bak-economics.com 27

Methodological Notes
Taxation

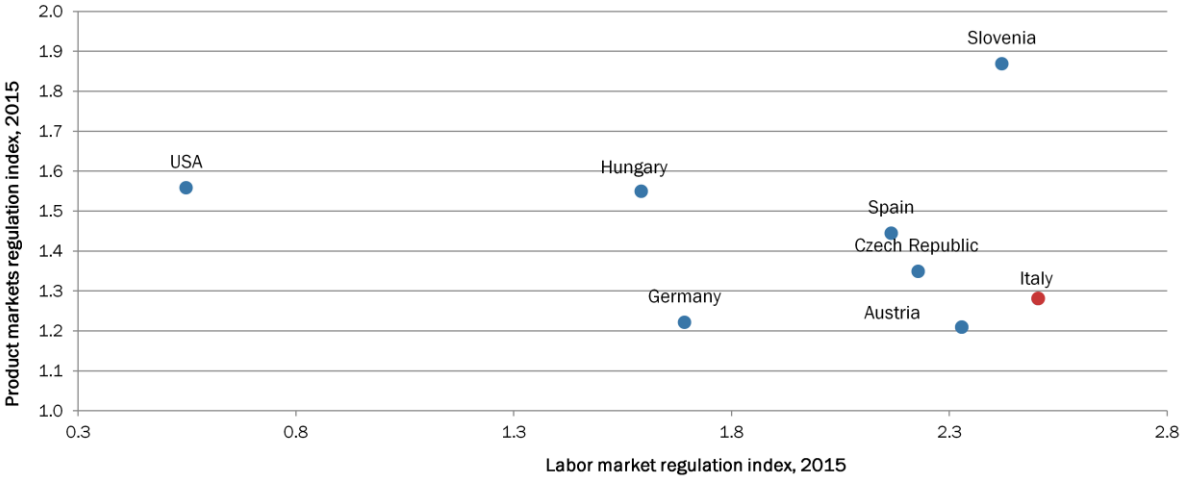
Taxation is an issue defined, to a large extent, on the national level. Nonetheless, it is an important issue for regions which affects its attractiveness to companies and talents and, thus, for its prospects for growth.

Company tax burden (in percentage of profits)
The average tax burden is the decisive criterion for corporations when selecting a location. This indicator measures the Effective Average Tax Rate (EATR) (in %) of companies including all direct company taxes for a typical profitable investment. The calculation includes income and capital taxes (including real estate taxes) and the most important rules for regulating the tax measurement basis.

Tax burden on a highly qualified employee (in percentage of gross income)
It measures the average tax rate for a highly qualified employee (available income after taxes: 100,000 EURO; married employee with two children). Taxes include the expected tax burden on pensions and social security contributions if mandatory and appropriate (has a tax characteristic).

Regional Attractiveness

Regulation of Product and Labor Markets



Note Index (0 = very liberal / 6 = very restrictive), regulation of regional economies depends on country specific product and labor regulations

Source OECD, Cato Institute, BAK Economics

Methodological Notes
Regulation of Product and Labour Markets

Regulation corrects market failures and compensates for externalities. But regulation is also costly. 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.

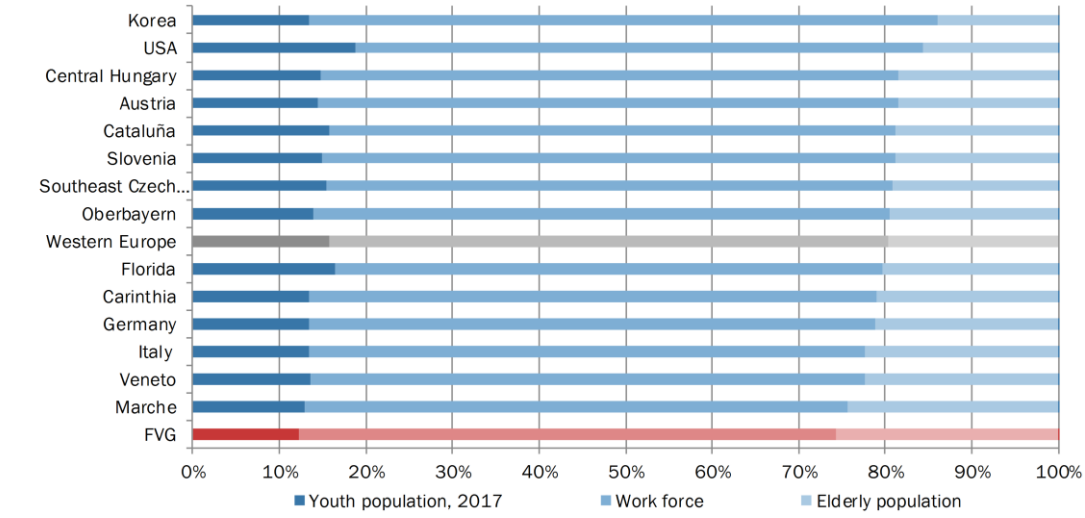
The labour market regulation index refers to the strictness of employment protection of regular contracts as well as temporary employment. The indicator is based on legal information that is coded and transformed. The higher the value, the stronger the regulation.

The product market regulation index comprises three sub-indices which are state control over enterprises, barriers to entrepreneurship as well as barriers to trade and investment. The indicators are based on legal information that are coded and transformed. The higher the value, the stronger the regulation.

Both indices range from 0 (no regulation) to 6 (restrictive regulation).

Regional Attractiveness

Population Composition



Note Percentage share of young population, working force, and elderly population (sorted by share of yound and work force); Spatial Planning Region München = Oberbayern

Source BAK Economics, OECD

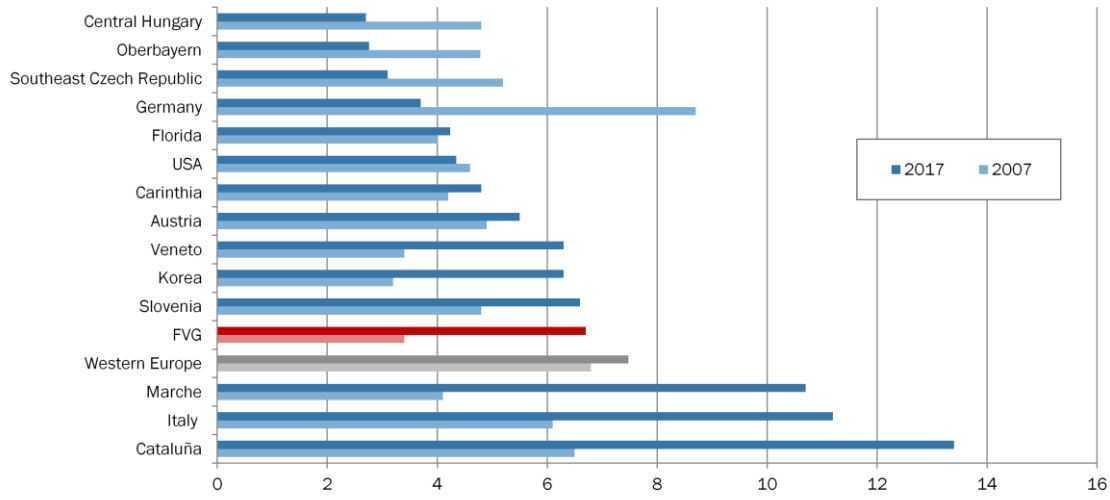
Methodological Notes
Population Composition

This graph describes the population with respect to different age groups and provides information about the work force and the dependency rates (youth and elderly population).

Youth population: Percentage of population under 15 years old relative to total population.
Work force: Percentage of working age population (15 to 64 years) relative to total population.
Elderly population: Percentage of population over 65 years old relative to total population.

Regional Attractiveness

Unemployment Rate



Note in %, Korea 2014, Oberbayern = Spatial Planning Region Munich 2014

Source BAK Economics, OECD

Methodological Notes
Unemployment Rate

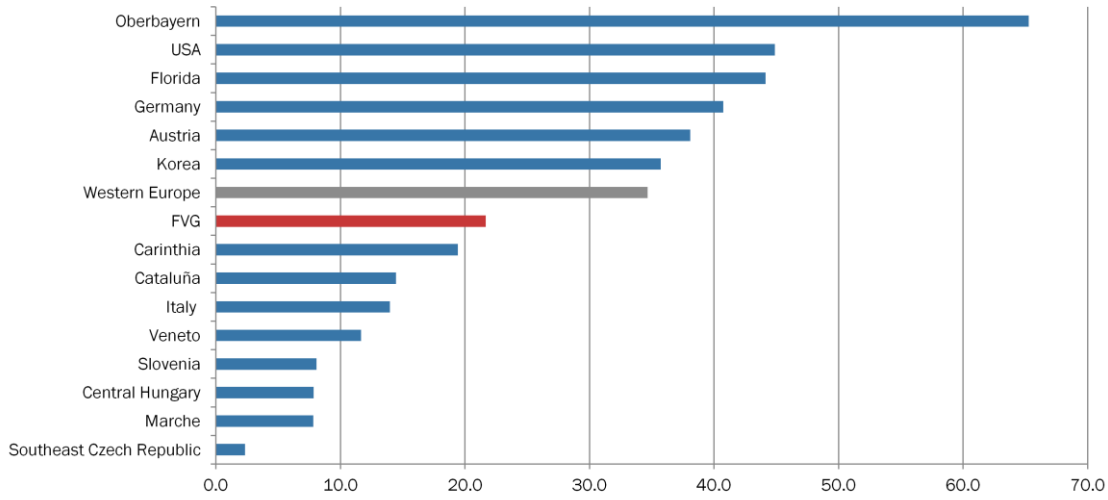
Employment in a region is an important indicator for the integration of the population in the labour market.

The unemployment rate is the share of a region's labour force who are unemployed and are searching for employment. A high rate decreases the economy's and society's sustainability.

The OECD harmonised unemployment rate indicates the number of unemployed persons as a percentage of the labour force (the total number of people employed plus the unemployed).

Regional Attractiveness

Patent Intensity



Note Number of patent applications per 1'000 employees in secondary sector, 2013-2015

Source BAK Economics, OECD Regpat March 2018

Methodological Notes
Patent Intensity

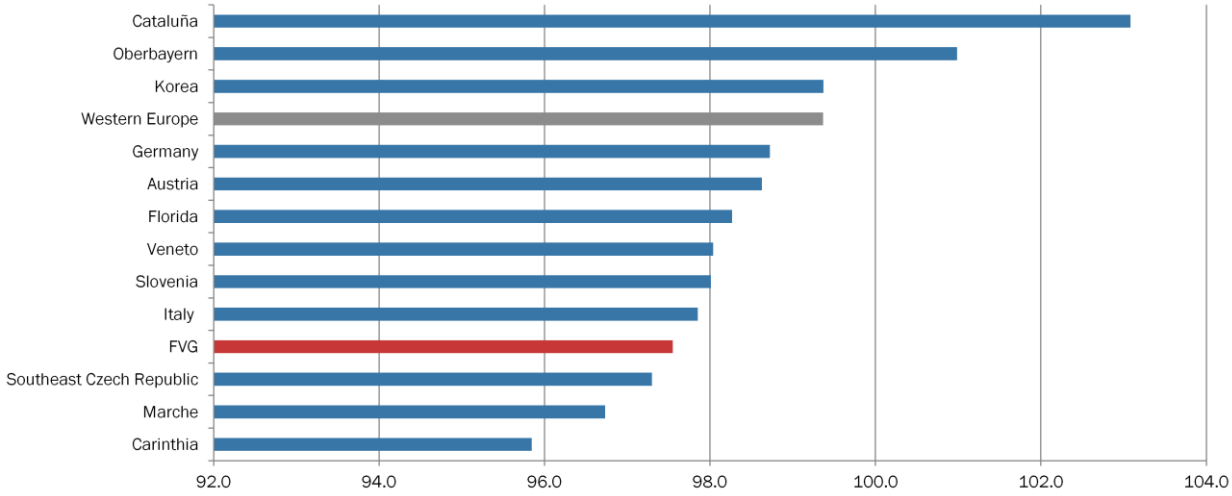
Patents are an indicator for the knowledge output of an economy. Patent intensity is representative of the technological and commercial utilization of research findings. Patents shed light on the phase before a product is introduced to the market.

Patents are counted partially according to the inventor's address. Only transnational patent applications were counted, that is, patents that had been applied in at least two countries (EPO and PCT-patents).

Patent intensity indicates the number of patent applications divided by the number of employees in manufacturing. The patent intensity measures the most recent patent activities, but it doesn't take into account the prior stock of patents in a region.

Regional Attractiveness

Quality of Universities



Note Index quality of universities in all sciences, 100 = average of all TL2 in WE and US, 2018

Source BAK Economics, CTWS Leiden

Methodological Notes
Quality of Universities

Besides patents, the number of publications is another valid indicator for measuring the innovative strength of a region. The world's leading universities foster high level scientific research and are essential for the development and dissemination of knowledge and skills.

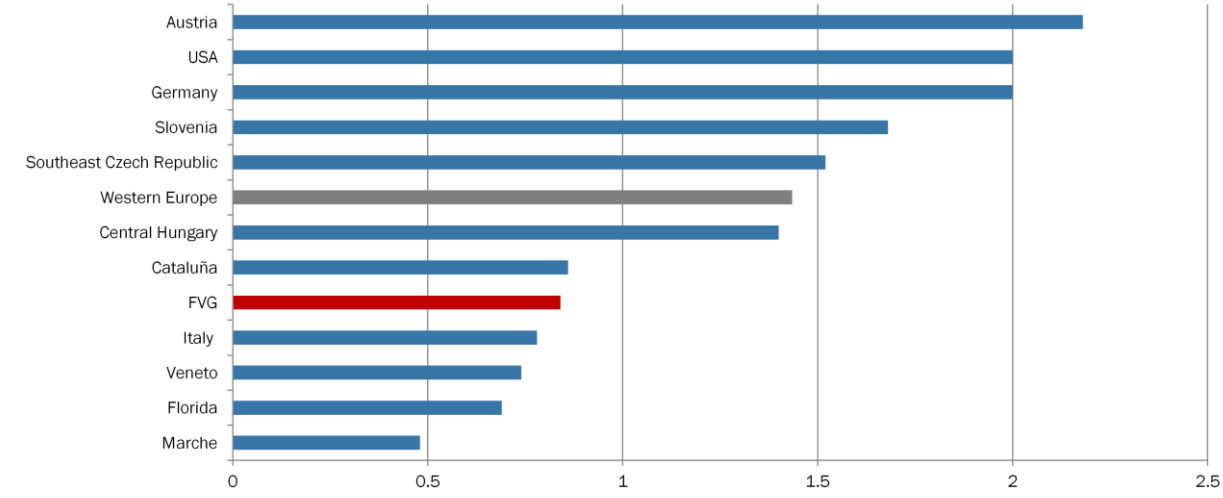
This graph shows the quality of universities in all sciences.

The BAK Quality of Universities Index relies on the CWTS Ranking of Leiden and is a measure of the intensity of the universities' quality in any given region. This intensity is measured by the university's number of scientific publications which count among the top 10% of cited publications adjusted (with a non-linear function) for the size of the population of the region.

The region's overall score depends on both the intensity of the quality of the universities within the region (3/4 weight) and the intensity of the quality of the universities in the surrounding regions (1/4 weight). The index is normalized. The average of all TL2 regions in Western Europe and the US is set to 100 and the standard deviation of the variable across the same set is calculated. This is set to 10. Therefore, an index value of 110 means the region's intensity of the quality of its universities is one standard deviation better than the average of all Western European and US TL2 regions.

Regional Attractiveness

Expenditures on Research and Development



Note Expenditures on research and development in business sector in % of GDP, 2015; Oberbayern is not available.

Source BAK Economics, OECD

Methodological Notes
Expenditures on Research and Development

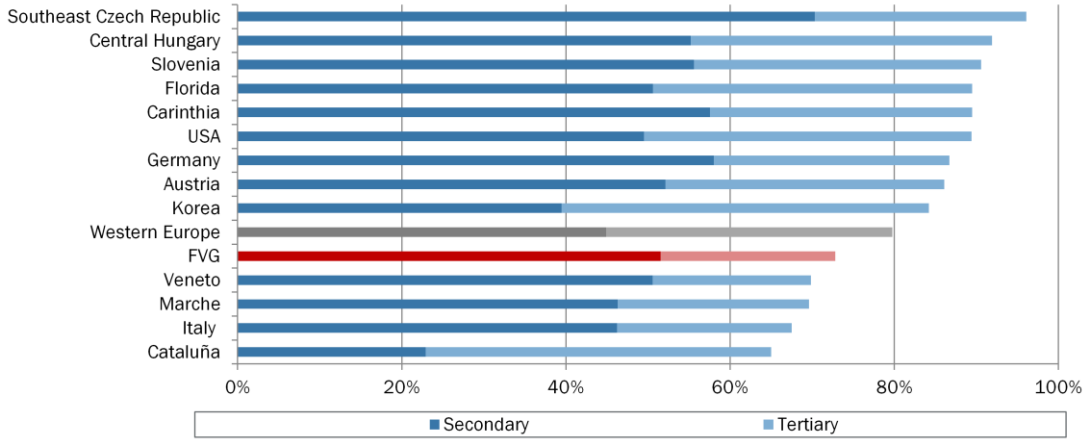
Research and development intensity measures the relative importance a country accords to the knowledge creation.

This indicator measures the expenditures on research and development performed by the business sector in percentage of GDP. It refers to all monies expended on research and development. High expenditures by the business sector indicate a strong participation in the utilization of forms of knowledge.

Research and development expenditures are mostly only available for larger administrative regions (Territorial Level 2 or NUTS 2).

Regional Attractiveness

Labour Force with Secondary and Tertiary Education



Note Share of labour force (in %) with attained secondary and tertiary education, 2017, Seoul 2016, California 2013, Oberbayern not available.

Source BAK Economics, OECD

bak-economics.com 34

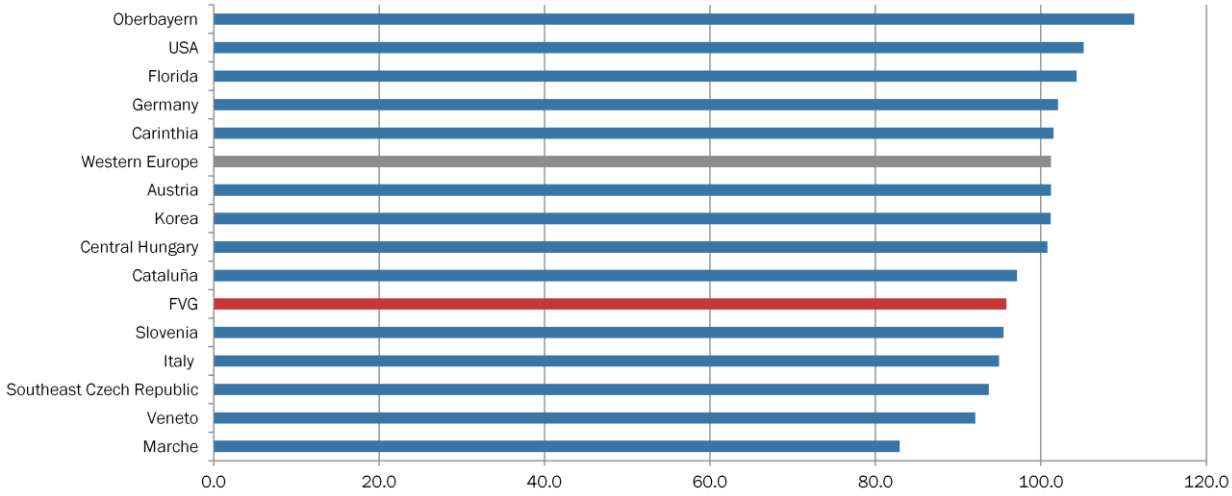
Methodological Notes
Labour Force with secondary and tertiary education

While the industries of highly developed countries are becoming more and more knowledge intensive, the production factor of human capital is becoming increasingly crucial. Human capital is understood as the sum of skills, creativity and knowledge of all people living or working in a region and contributing to the economic success of firms and the economy in general.

A good way to assess the human capital of a person is to look at his highest level of formal education achieved. The indicators used are the share of total labour force with a tertiary degree and the share of total labour force with a secondary degree (but not a tertiary). The educational attainment of the labour force is only available for larger administrative regions (Territorial Level 2 or NUTS 2).

Competitiveness

BAK Competitiveness Index



Note Index, WE15 & US = 100, RED 2018

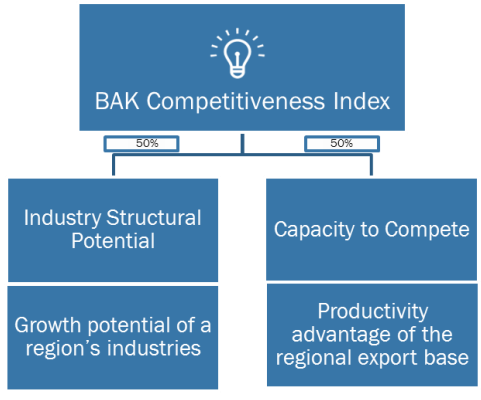
Source BAK Economics

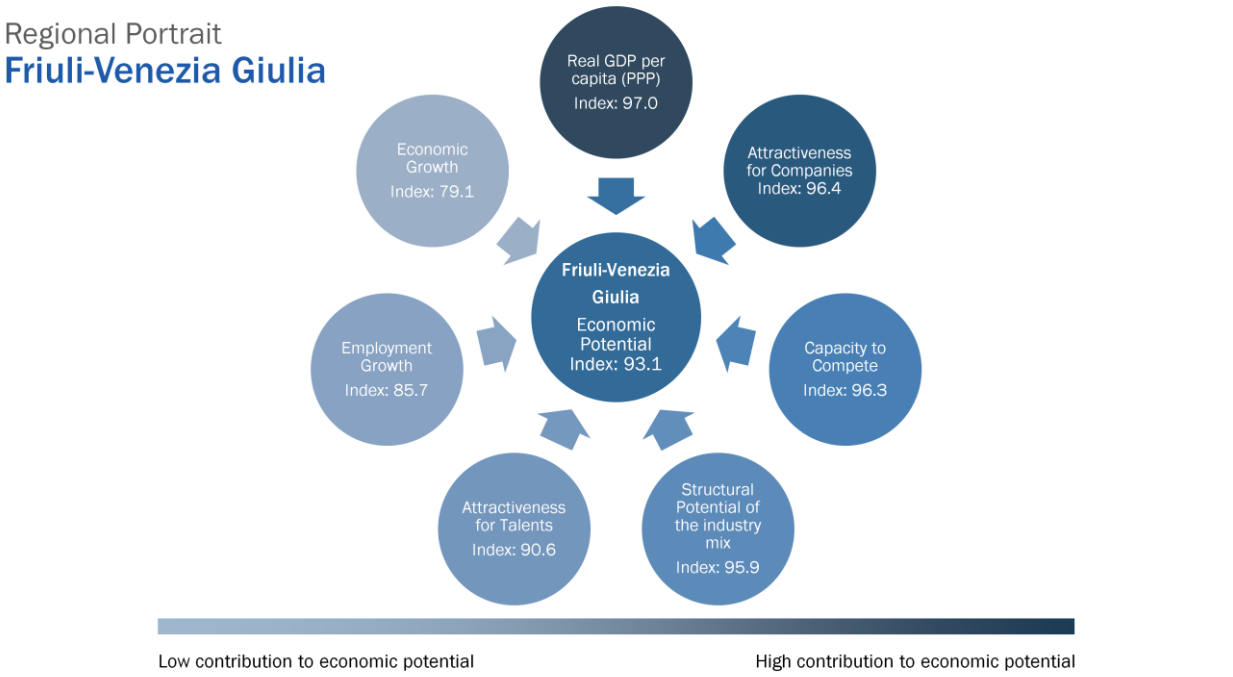
Methodological Notes
BAK Competitiveness Index

The *Competitiveness Index* is divided in two components: *Industry Structural Potential* and *Capacity to Compete*. The *Industry Structural Potential* focuses on the regional industry structure and its inherent potential for further growth. It measures the growth potential of industries until 2030 in percent. A regional concentration of industries with bright prospects for expansion enhances the potential for the region for substantial and sustainable growth and vice versa.

The main determinants for competitiveness are the productivity advantages of the export industries, measured as the productivity of the export base (PPP USD). In the long run, a more productive industry in a region should be able to gain market shares in the globalized economy and grow stronger than the same industry in another region when it is less productive. The *Capacity to Compete* captures the competitiveness of the region by summarising these productivity indicators for all the export oriented industries.

The average of all Territorial Level 2 (TL2) regions in Western Europe and the US is set to 100. The standard deviation of the variable of the same set is set to 10. Therefore, an index value of 110 means the region's economic potential is one standard deviation better than the average of all European and US TL2 regions. An index of 80 means it is two standard deviations below the average.





Methodological Notes
Regional Portrait

This illustration of the regional portrait shows the values of the sub-indices (Index 100 = average of benchmark regions (Western Europe 15 and USA) between 2010 and 2014) for a region and their level of contribution to the overall economic potential of the region. The darker blue the bubbles is, the higher the index's contribution to the economic potential.

The BAK Performance Index is represented by the following three sub-indices:
- Real GDP per capita
- Economic growth
- Employment growth

Real Gross Domestic Product (GDP) per capita (in USD PPP) is a core indicator of economic performance and measures the region's level of prosperity. Economic growth expressed in real terms captures the changes in economic performance, measured by changes in the volume of real GDP over the last 10 years. A region is successful whenever an increase in production creates new jobs. Employment growth captures this part of economic performance by looking at increases with respect to decreases in job creation over the last 10 years.

The BAK Attractiveness Index is divided into Attractiveness Indices for Companies and Talents. The Attractiveness Index for Companies comprises indicators in the fields of State, Business and Science. The Attractiveness Index for Talents includes further indicators in the fields of State, Business and Society.

The BAK Competitiveness Index is divided into two components:
- Industry Structural Potential (focus on regional industry structure and its inherent potential for further growth by 2030) and
- Capacity to Compete (productivity of the export base (in PPP USD)).

Further Information

Definition of Benchmarking Regions

Region	Country	Typ	Description	BAKCode
Austria	AT	OECD	Country	AT
Carinthia	AT	OECD	Bundesländer	AT21x
Slovenia	SI	OECD	Country	SI
Germany	DE	OECD	Country	DE
Oberbayern	DE	BAK	BAK aggregate	DExAxRBO
Southeast Czech Republic	CZ	OECD	Oblasti	CZ06x
Central Hungary	HU	OECD	Planning Statistical Regions	HU10x
Cataluña	ES	OECD	Comunidades y ciudades autónomas	ES51x
Italy	IT	OECD	Country	IT
Friuli-Venezia Giulia (FGV)	IT	OECD	Regioni	ITH4x
Marche	IT	OECD	Regioni	ITI3x
Western Europe	INT	BAK	BAK Aggregate	INTxAxW15
USA	US	US Census Bureau	Country	US
Florida	US	US Census Bureau	States	US12x
Korea	KR	OECD	Country	KR
Veneto	IT	OECD	Regioni	ITH3x