

Development of a regional measure of real Gross Value Added using a production approach

This article presents an update on progress towards the development of regional Gross Value Added using a production approach, GVA(P), and plans for the future leading to the publication of a full set of results in 2014. The article includes details of the data and methods used to compile regional GVA(P), and presents a preliminary set of results for the NUTS1 regions, at both current prices and constant prices.

These data represent an early view of real regional GVA growth, but are highly experimental and we advise users to exercise caution in the interpretation and use of these statistics. Where the GVA(P) results differ significantly from the existing GVA(I) measure, the GVA(I) figures should be considered the better estimates. We welcome any feedback from users on the preliminary GVA(P) results.

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Background

The project to develop a measure of regional Gross Value Added using the production approach (GVA(P)) was initiated in response to the Review of Economic Statistics for Policymaking by Christopher Allsopp in 2003 ⁽¹⁾. One of the recommendations of the review was for the development and publication of regional GVA at constant prices, which involves deflating annual data that are produced at current prices. On conceptual grounds this can only be achieved by developing a method of calculating regional GVA on a production basis. At present regional GVA is only calculated on an income basis, which does not permit deflation and therefore cannot be used to calculate estimates in constant prices.

Income and Production approaches

The approach that is currently used to compile regional GVA in the UK is the income approach, or GVA(I). This method uses the sum of all income from employment (compensation of employees), self-employment (mixed income) and other income generated by the production of goods and services (gross operating surplus). A top-down approach is used, whereby the UK National Accounts total for each component of income is allocated to the regions using proportions from regional data sources. These data are at current prices. The effects of price inflation and regional price variation are not removed as conceptually there is no satisfactory method of deflating gross operating surplus.

The other method of compiling regional GVA is the production approach, or GVA(P). In this approach GVA is calculated as the total of all goods and services that are produced during the reference period (output), less goods and services used up or transformed in the production process, such as raw materials and other inputs (intermediate consumption). This approach is conceptually equal to the income approach, but it allows deflation of current prices to produce constant price measures since the components relate to goods and services which can be broken down into price and volume indices.

(1) http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/consultations_and_legislation/allsopp_review/consult_allsopp_index.cfm

Progress to date

Early work on the project concerned the development of appropriate methodology and the identification of suitable data sources for GVA(P). This stage of the project culminated in the publication of an article in 2007⁽²⁾.

The article discussed a variety of possible methods and concluded that the best option would be a hybrid approach involving several data sources and deflation methods, based upon their availability and fitness for purpose as measures for each industrial sector of the economy. Following further investigation and development work, the sources of data and deflators for regional GVA(P) have now been finalised and are summarised in Table 1.

The first experimental results were compiled in 2008, using data from the Annual Business Inquiry 2 (ABI2) as the main source of data for the majority of industries. The initial results raised some issues of data quality, in particular some industries showed an unexpected bias towards production in the London region.

The ABI2, now renamed as the Annual Business Survey (ABS), is a sample survey that collects data at enterprise level only. A modelling procedure is used to apportion data between the constituent local units that make up each enterprise, which can then be weighted to produce regional estimates.

The plan at that time was to make use of the new Business Register and Employment Survey (BRES), which collects data for local units directly, to improve the quality of the ABS regional apportionment model. However, it has proven to be impracticable to make the necessary changes, owing to the difficulties encountered in validating the turnover data collected in the BRES and the cost of the changes to the ABS computer system.

Despite this setback, the ABS regional apportionment has been improved by a change to the weighting methodology, and it is expected that this will help to address the data quality issues in GVA(P) results.

More recently there has been renewed interest in the GVA(P) project due to the development of the new European System of Accounts 2010 (ESA10). It is expected that the finalised version of ESA10 will include the legal requirement for EU Member States to provide real (i.e. deflated) measures of annual regional GVA growth by 2014. Such measures can only be provided by the use of constant price GVA(P).

Work on GVA(P) during 2011 has concentrated on the development of a new compilation system designed to produce results according to the new Standard Industrial Classification 2007 (SIC07)⁽³⁾, which was introduced throughout the UK National and Regional Accounts in 2011.

(2): <http://www.ons.gov.uk/ons/guide-method/development-programmes/allsopp-programme/regional-gva--production-approach-/allsopp-regional-gva-p--project--methods-development-of-regional-gva-on-a-production-basis.pdf>

(3): <http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html>

Future plans

The new system currently provides results at both current prices and constant prices, but only for the NUTS1 level of regional geography. The ESA10 requirement is for results at the NUTS2 level, and this will be the next stage of the system to be developed, during 2012-13. In addition to system building, this stage of the project will include a comprehensive quality assurance of all the data inputs at the lower level of geography.

The current plan is to publish experimental results for both NUTS1 and NUTS2 areas in 2013, while continuing to explore the scope for further methodological enhancements to the data sources and compilation processes.

Any improvements will then be implemented for the production of a full set of results in 2014, which will be published on the ONS website and supplied to Eurostat to meet the requirement under ESA10.

Data and methods

GVA(P) is compiled using a top-down approach. The data from the sources listed in Table 1 are used to calculate regional proportions for each of 112 industry components, corresponding to the industry groups used in the National Accounts Supply and Use Tables (SUT). These regional proportions are then used to allocate the UK total for that industry obtained from the most recent UK National Accounts Blue Book.

A consequence of this methodology is that current price regional GVA(P) will always match the latest national totals for each industry, even though at regional level GVA(P) and GVA(I) estimates may differ due to the different methods used to compile them.

Constant price GVA(P) is derived by deflating the current price estimates for each of the 112 industries using deflators obtained from the UK Gross Domestic Product (Output) (GDP(O)) system. These are the same deflators that are used to produce National Accounts constant price estimates.

National deflators are used because there are no regional price indices currently available. The new Manual on Regional Accounts, currently being prepared by an EU Task Force, recommends that in the absence of regional prices the use of national deflators is acceptable provided that deflation occurs at a minimum level of 64 industries. Greater industrial detail allows the deflation to take account of regional variation in industrial composition.

Ideally output and intermediate consumption should be deflated separately, using prices relating to outputs and inputs respectively. This is known as double deflation. However, there are also no suitable input price indices available for use in deflating intermediate consumption. For this reason GVA(P) only uses single deflation of current price GVA.

ONS methodologists are currently reviewing the smoothing methods that are used in the compilation of the headline regional GVA(I). This review may recommend some changes to current practice, which will be implemented following consultation with users. The regional GVA(P) compilation system does not yet have any facility for smoothing the data. Once the outcome of the review is known, we will consider the application of smoothing to GVA(P) results.

Table 1: Data sources used to compile regional GVA(P)

SIC07 Section	Title	SUT groups	Regional data source(s)
A	Agriculture, forestry and fishing	1-3	Output and intermediate consumption from ABS; Agriculture data from DEFRA
B	Mining and quarrying	4-8	Output and intermediate consumption from ABS
C	Manufacturing	9-52	Output and intermediate consumption from ABS; ABS turnover for the tobacco industry
D	Electricity, gas, steam and air conditioning supply	53-54	Output and intermediate consumption from ABS
E	Water supply; sewerage, waste management and remediation	55-58	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE
F	Construction	59-61	Output and intermediate consumption from ABS; Sole traders data from HMRC
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	62-64	Output and intermediate consumption from ABS
H	Transportation and storage	65-70	Output and intermediate consumption from ABS; Sole traders data from HMRC
I	Accommodation and food service activities	71-72	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE; Sole traders data from HMRC
J	Information and communication	73-78	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE; Sole traders data from HMRC
K	Financial and insurance activities	79-82	Output and intermediate consumption from ABS; Finance and insurance data from GVA(I)
L	Real estate activities	83-85	Output and intermediate consumption from ABS; Owner-occupied imputed rental from GVA(I)
M	Professional, scientific and technical activities	86-93	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE; Sole traders data from HMRC
N	Administrative and support service activities	94-99	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE
O	Public administration and defence; compulsory social security	100	Public administration data from GVA(I)
P	Education	101	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE
Q	Health and social work	102-104	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE
R	Arts, entertainment and recreation	105-108	Output and intermediate consumption from ABS; Public sector employment from BRES/NISRA; Public sector earnings from ASHE
S	Other service activities	109-111	Output and intermediate consumption from ABS
T	Activities of households as employers and for own use	112	Household data from GVA(I)

Description of data sources

Annual Business Survey (ABS)

The principal data source for GVA(P) is the ABS, which provides regional output and intermediate consumption for all industries except public administration, finance and insurance activities, pension funding, households as employers and imputed rent of owner-occupied dwellings. The ABS data are used to allocate national totals to regions. Regional GVA is then calculated as output minus intermediate consumption.

The data obtained from the ABS are actually GVA and intermediate consumption, and output is calculated as GVA plus intermediate consumption. The reason for this is to facilitate a future change to double deflation (separate deflation of output and intermediate consumption) if suitable input price indices should become available.

ABS turnover is used to allocate GVA of the tobacco industry to regions, owing to quality issues relating to the GVA and intermediate consumption data for that industry.

Annual Survey of Hours and Earnings (ASHE)

Business Register and Employment Survey (BRES)

Northern Ireland Statistics and Research Agency (NISRA)

For industries with a significant public sector element, the number of public sector employees is multiplied by the average earnings for public sector workers in that industry to provide a measure of non-market output. This is used to allocate public sector GVA to regions.

The earnings data are obtained from the ASHE, while the public sector employee numbers are obtained from the BRES, except for Northern Ireland, where data are provided from BRES and the Census of Employment by NISRA.

The exception to this method is the public administration industry, which uses the GVA(I) measure to ensure consistency.

Her Majesty's Revenue and Customs (HMRC)

The ABS sample is based on the Interdepartmental Business Register, which does not provide a very good coverage of sole traders and other very small companies, particularly those operating below the VAT registration threshold.

For industries with a significant number of sole traders, regional profits data provided by HMRC are used instead. These data provide an alternative measure, used to allocate the national total gross operating surplus for sole traders. This replaces ABS data for sole traders that are removed from the national total output prior to allocation to regions.

Department for Environment, Food and Rural Affairs (DEFRA)

Output and intermediate consumption data for agricultural activities in the whole of the UK are provided by DEFRA. These data only cover the farming activities of companies classified to the agriculture industry. Any other activities carried out by the same businesses are measured using the ABS data.

Regional Gross Value Added (Income) (GVA(I))

The ABS does not cover banking, finance and insurance auxiliaries, pension funding, or households with employees. For these industries the closest corresponding GVA data from the Regional Accounts income measure are used as proxy indicators to allocate the national total to regions.

The ABS does not cover insurance companies, but data are only available from 2009, and there are some quality issues still to be resolved. In the interim GVA(I) data are also being used to allocate insurance to regions. Use of the ABS data will follow once these issues are resolved.

Because the public administration industry is exclusively covered by the non-market public sector measure, and it is recognised that the existing income-based measure provides a better quality estimate of non-market activities, the GVA(I) data are also used to allocate public administration to regions.

Income-based GVA data are also used to measure Owner-occupied imputed rental, a National Accounts concept that represents the value added to the economy by people living in their own houses, instead of renting accommodation. In effect, owner-occupiers are assumed to be paying rent to themselves.

Preliminary results

The regional GVA(P) results shown in this article are experimental and represent an interim stage of development. They should not be taken as final data and do not carry the National Statistics badge of quality. Users should treat these results with caution, and only make use of them alongside the corresponding GVA(I) results published by ONS Regional Accounts.

In the tables and charts that follow, the current price experimental GVA(P) data are shown alongside the corresponding GVA(I) National Statistics. GVA(I) is published in two forms, headline (smoothed) and raw (unsmoothed). The data shown for comparison here are the raw figures. Where the current price data differ significantly, users are strongly advised to use the GVA(I) figures, which have undergone the rigorous quality assurance required for all National Statistics.

The constant price GVA(P) indices, published here for the first time, may be used to give a general guide to the growth of regional GVA excluding inflation. Again, users are cautioned not to use these figures as the basis for policy decisions, or to judge the performance of regions against policy targets. Only when GVA(P) attains the National Statistics badge will the data be of sufficient reliability for such uses.

It is possible to derive regional deflators from these data (current price index divided by constant price index). These implied deflators will not represent true regional price differences, but will mirror the regional composition of industries, and therefore products, at a detailed level.

The preliminary results show that, at current prices, GVA(P) provides a higher level of GVA for London and the South East than does GVA(I), and correspondingly lower GVA in most other regions. This is in part due to the fact that both measures are constrained to sum to the UK total GVA as published in the most recent National Accounts Blue Book.

The results also include GVA that cannot be allocated to a specific region or regions, such as the activities of UK embassies abroad, UK military personnel overseas and offshore oil and gas extraction. Such GVA is allocated to the Extra-Regio category.

It seems likely that different data sources will provide better or worse measures for individual industries, either conceptually or in data quality terms. An evaluation of this issue will feature in the future development of the GVA(P) measure, with the eventual aim being the formulation of a single balanced measure of regional GVA drawing on the best aspects of both measures, in much the same way that the three measures of GDP are balanced ⁽⁴⁾.

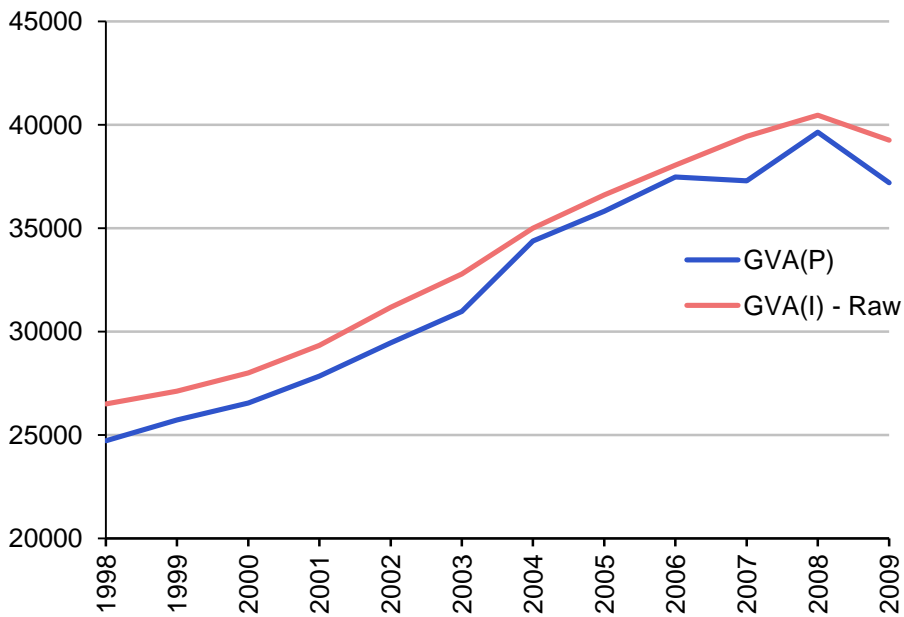
(4): <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/economy/national-accounts/gdp/index.html>

Comparison of GVA(P) and GVA(I) at Current Prices: All Industries												
GVA(P) (£ million)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
North East	24 723	25 715	26 549	27 846	29 447	30 966	34 372	35 815	37 475	37 286	39 637	37 185
North West	74 903	79 921	79 687	85 813	90 406	96 690	101 804	106 433	113 089	118 863	115 768	118 282
Yorkshire and The Humber	54 928	56 323	57 877	60 954	65 618	69 460	74 027	77 062	81 687	87 573	86 843	84 491
East Midlands	47 406	47 936	49 605	51 900	54 772	57 606	62 190	65 334	67 797	71 927	70 265	69 584
West Midlands	60 481	64 127	64 967	67 726	71 940	74 765	80 699	81 222	87 595	90 224	90 242	86 402
East of England	67 750	69 675	73 392	77 573	80 874	86 225	88 491	94 664	97 032	101 849	101 122	103 825
London	167 652	178 260	189 750	197 760	210 192	225 286	236 566	246 733	265 750	290 226	306 718	298 666
South East	115 165	124 166	129 398	135 025	143 556	151 322	154 437	161 792	168 575	177 159	184 630	178 592
South West	55 701	59 371	62 893	67 174	69 556	74 235	80 055	82 412	84 255	89 284	90 383	92 143
Wales	27 361	28 804	29 672	29 829	31 985	33 768	35 531	37 630	40 954	42 733	41 346	42 259
Scotland	60 380	60 095	62 702	67 840	71 520	74 429	81 275	82 566	89 612	92 192	99 544	96 261
Northern Ireland	16 624	17 811	19 321	20 544	20 474	23 208	23 924	25 170	27 317	29 176	29 111	28 159
Extra-Regio	8 963	10 710	18 223	17 409	16 557	16 744	16 998	20 049	22 803	24 108	28 272	21 083
GVA(I) - Raw (£ million)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
North East	26 489	27 108	28 004	29 326	31 178	32 788	35 000	36 600	38 050	39 438	40 459	39 255
North West	78 986	83 293	84 881	89 622	94 393	98 371	104 072	107 371	111 908	117 871	119 197	116 212
Yorkshire and The Humber	58 789	59 840	61 977	65 215	69 644	73 252	77 215	79 863	83 306	87 476	88 765	86 806
East Midlands	50 515	52 485	53 121	56 471	60 272	65 042	67 991	69 989	74 398	78 665	78 724	78 132
West Midlands	63 022	65 574	67 882	71 160	74 727	78 121	81 450	83 972	87 896	91 567	93 301	89 556
East of England	67 824	70 124	75 074	78 477	81 334	88 331	94 242	98 362	104 396	109 648	109 073	107 693
London	146 485	157 729	169 495	176 656	185 692	199 028	210 008	223 431	239 308	254 789	270 002	269 031
South East	110 149	117 631	122 248	129 375	137 952	146 340	153 166	158 000	168 040	180 261	181 564	179 601
South West	59 109	62 082	64 195	68 650	72 867	77 485	82 120	85 297	90 436	94 571	96 770	96 181
Wales	29 632	30 989	31 557	33 209	35 317	36 977	39 626	40 408	42 634	44 900	45 425	43 824
Scotland	64 537	66 410	67 592	71 421	75 882	79 527	84 386	88 446	93 940	100 839	103 677	102 602
Northern Ireland	17 537	18 940	19 786	20 401	21 085	22 696	24 096	25 095	26 826	28 471	28 654	26 956
Extra-Regio	8 963	10 710	18 223	17 409	16 557	16 744	16 998	20 049	22 803	24 108	28 272	21 083

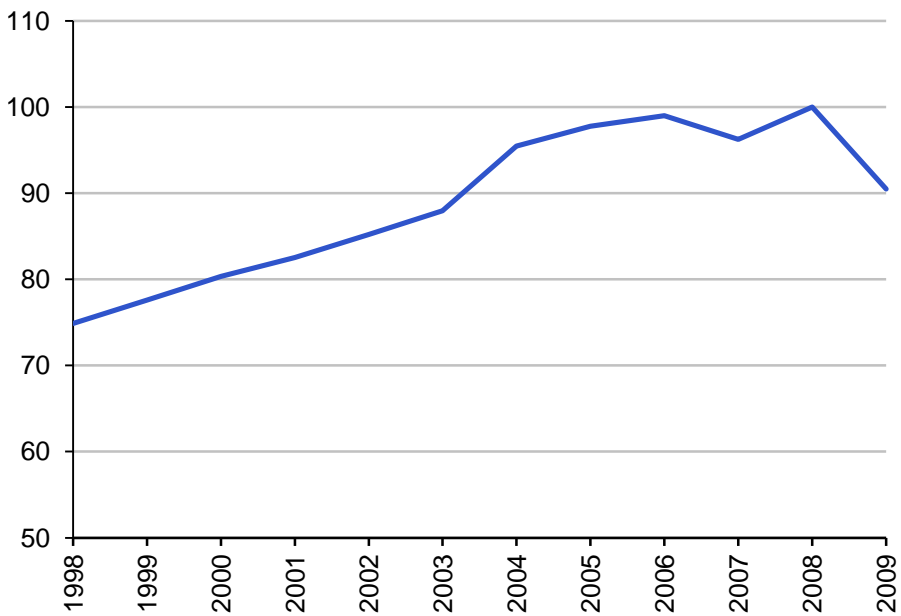
GVA(P) Constant Price Indices (2008 = 100) and Annual Growth Rates (%): All Industries												
GVA(P) Constant Price Indices	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
North East	74.9	77.6	80.3	82.5	85.2	88.0	95.4	97.8	99.0	96.2	100.0	90.5
North West	78.6	82.7	83.1	87.2	89.5	92.9	96.1	98.9	102.2	105.3	100.0	99.8
Yorkshire and The Humber	77.6	79.0	81.0	83.6	87.9	90.7	94.0	96.5	99.2	103.9	100.0	94.3
East Midlands	81.2	81.6	85.0	86.8	89.1	91.8	97.3	100.5	101.3	104.9	100.0	96.4
West Midlands	80.2	84.2	85.8	87.7	90.8	92.6	98.0	97.1	101.8	102.5	100.0	93.4
East of England	81.4	82.6	87.7	90.2	91.0	94.8	95.4	101.0	100.7	103.3	100.0	100.3
London	66.8	69.9	75.0	77.0	78.8	82.8	84.8	87.2	91.6	98.7	100.0	94.1
South East	76.0	79.9	83.7	86.3	88.3	91.4	91.0	94.0	95.5	98.3	100.0	94.1
South West	74.6	78.8	84.4	88.1	88.5	92.3	97.2	98.8	98.0	101.3	100.0	98.8
Wales	80.5	85.3	87.9	86.3	90.6	92.9	95.4	99.3	104.6	105.9	100.0	100.7
Scotland	73.8	73.2	76.2	80.2	82.7	84.2	90.4	90.9	94.9	95.3	100.0	93.5
Northern Ireland	69.6	73.5	80.2	83.1	80.7	90.0	90.7	94.0	98.7	102.3	100.0	95.0
Extra-Regio	144.2	152.3	153.7	149.4	150.3	147.3	132.2	119.5	108.9	109.3	100.0	88.4
GVA(P) Constant Price Growth (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
North East	-	3.6	3.6	2.7	3.2	3.3	8.5	2.4	1.2	-2.8	3.9	-9.5
North West	-	5.3	0.4	4.9	2.6	3.8	3.4	2.9	3.3	3.0	-5.0	-0.2
Yorkshire and The Humber	-	1.8	2.5	3.2	5.0	3.2	3.7	2.7	2.8	4.8	-3.8	-5.7
East Midlands	-	0.5	4.2	2.1	2.7	3.0	6.0	3.3	0.8	3.6	-4.7	-3.6
West Midlands	-	4.9	2.0	2.2	3.6	1.9	5.9	-0.9	4.8	0.7	-2.4	-6.6
East of England	-	1.5	6.2	2.9	0.9	4.2	0.7	5.8	-0.2	2.5	-3.1	0.3
London	-	4.8	7.3	2.7	2.3	5.0	2.4	2.9	5.0	7.8	1.3	-5.9
South East	-	5.1	4.7	3.1	2.4	3.5	-0.4	3.2	1.6	3.0	1.7	-5.9
South West	-	5.7	7.0	4.4	0.4	4.4	5.3	1.6	-0.8	3.3	-1.3	-1.2
Wales	-	6.0	3.0	-1.8	4.9	2.6	2.6	4.1	5.3	1.3	-5.6	0.7
Scotland	-	-0.9	4.1	5.2	3.2	1.8	7.4	0.5	4.5	0.4	4.9	-6.5
Northern Ireland	-	5.6	9.1	3.7	-2.9	11.6	0.8	3.6	5.0	3.6	-2.3	-5.0
Extra-Regio	-	5.6	0.9	-2.8	0.6	-2.0	-10.3	-9.6	-8.8	0.4	-8.5	-11.6

North East

GVA(P) and GVA(I) at Current Prices (£m): All Industries

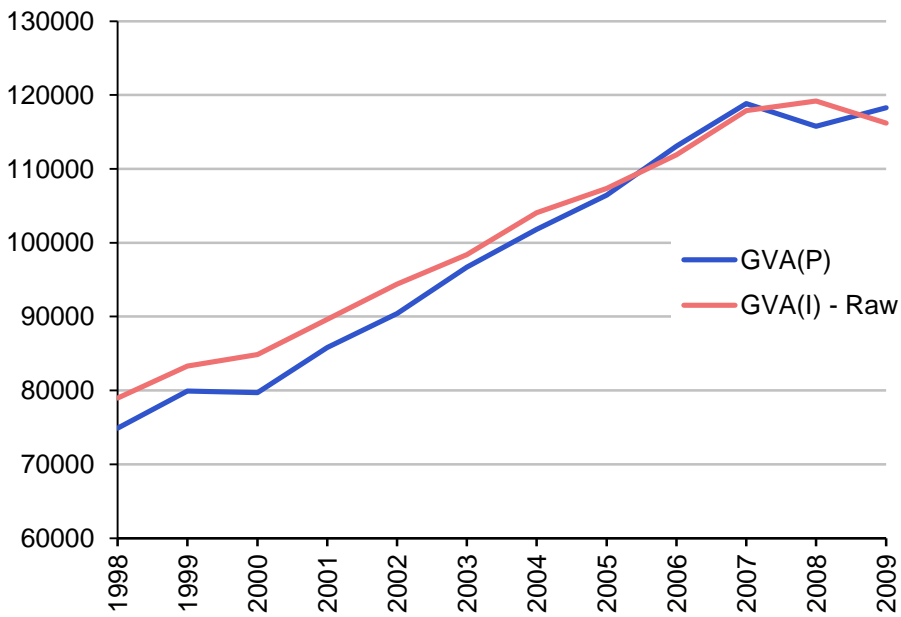


GVA(P) Constant Price Index (2008 = 100): All Industries

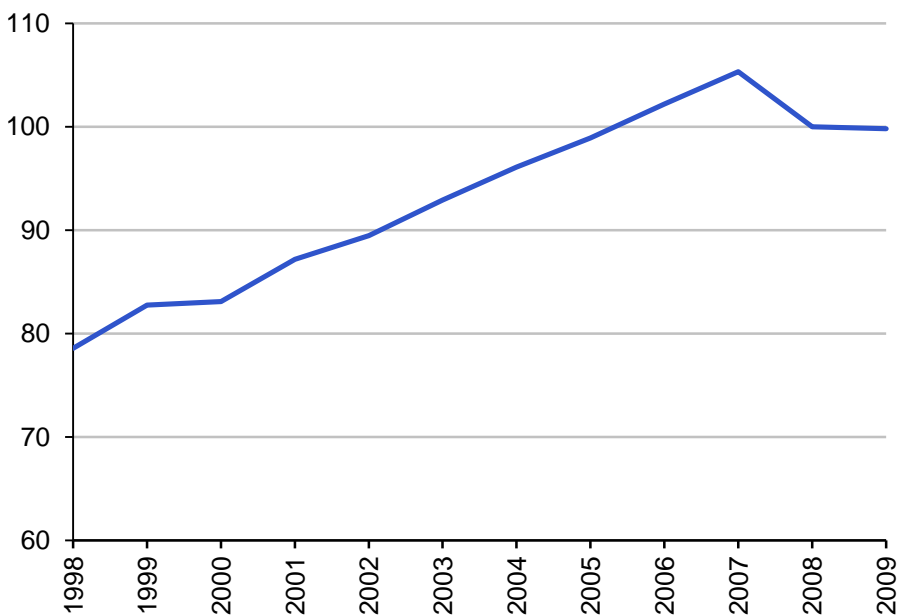


North West

GVA(P) and GVA(I) at Current Prices (£m): All Industries

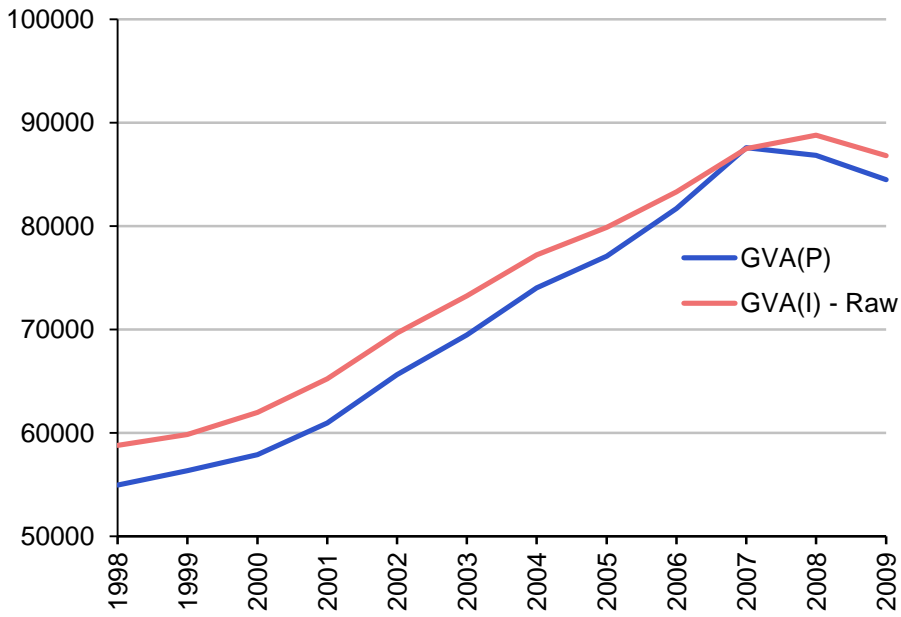


GVA(P) Constant Price Index (2008 = 100): All Industries

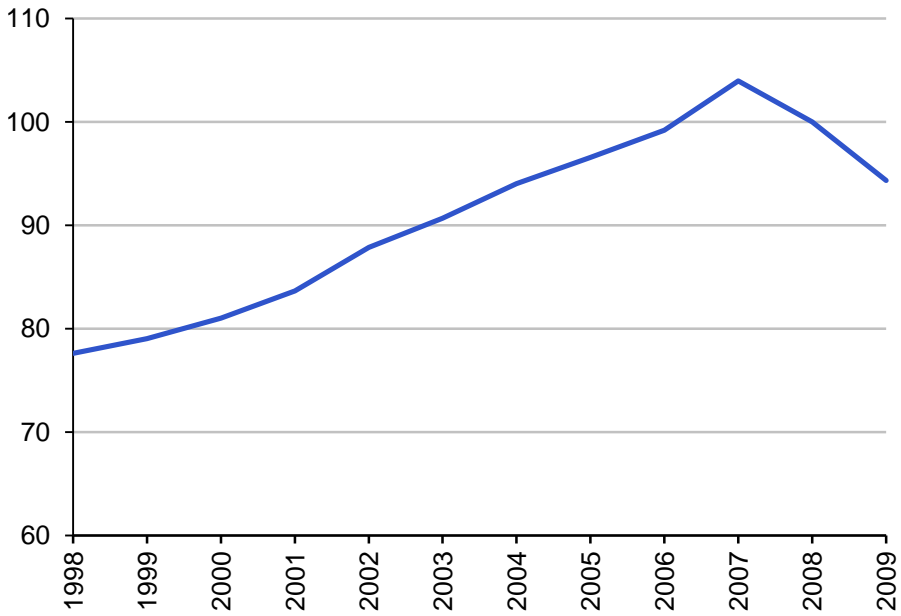


Yorkshire and The Humber

GVA(P) and GVA(I) at Current Prices (£m): All Industries

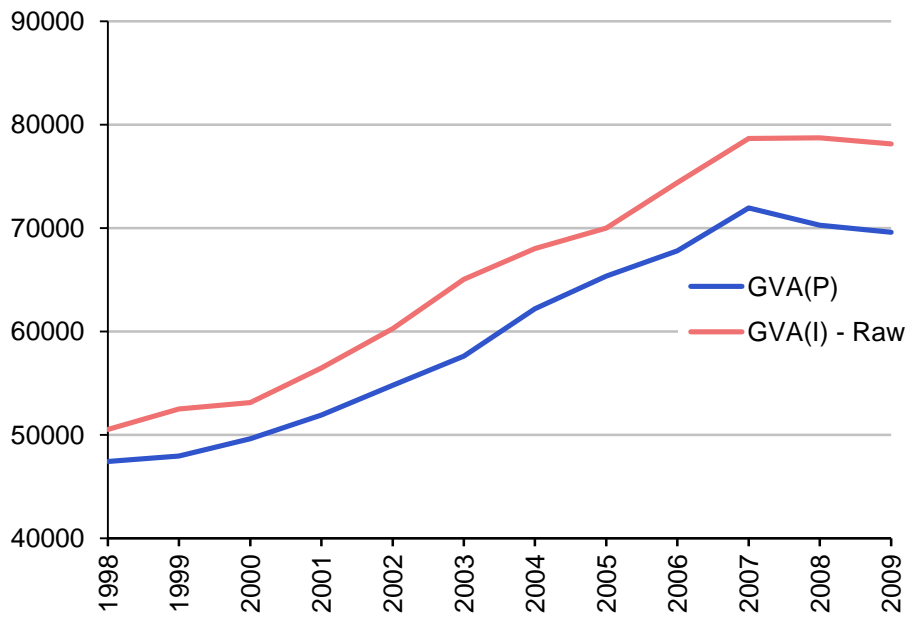


GVA(P) Constant Price Index (2008 = 100): All Industries

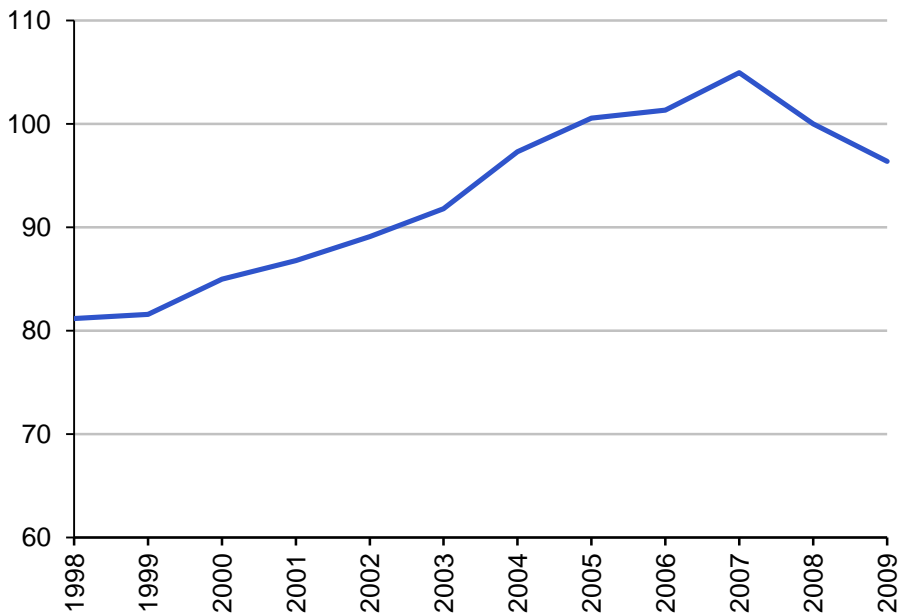


East Midlands

GVA(P) and GVA(I) at Current Prices (£m): All Industries

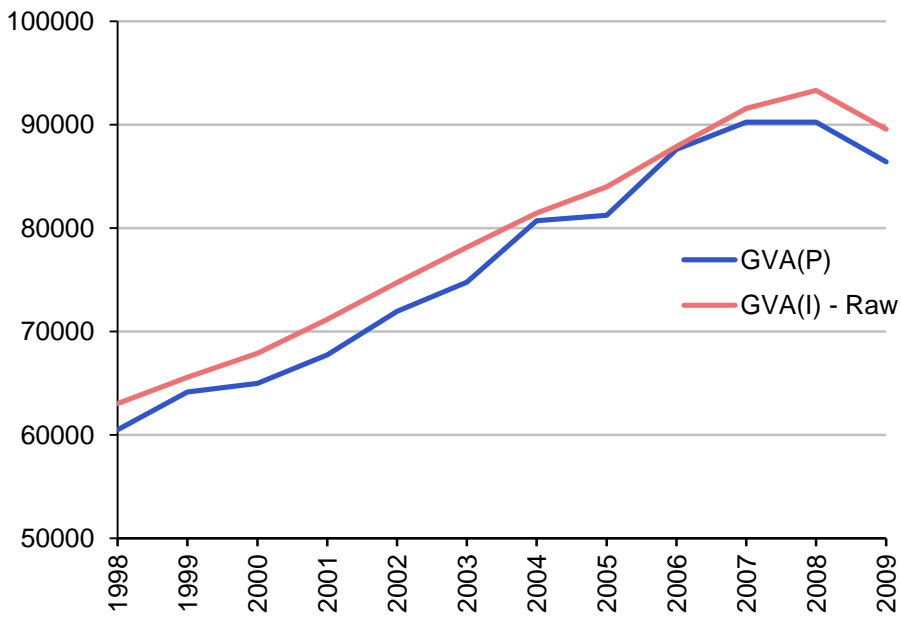


GVA(P) Constant Price Index (2008 = 100): All Industries

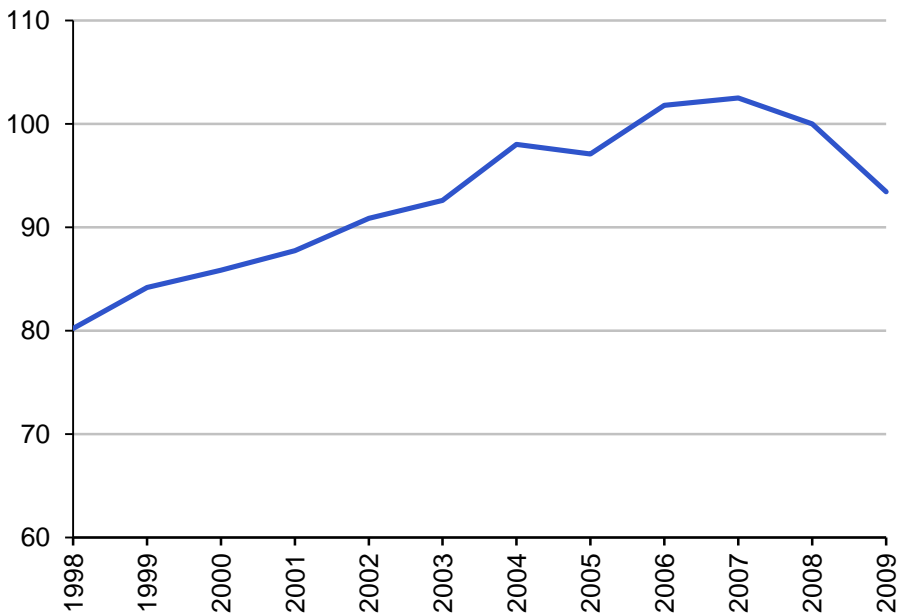


West Midlands

GVA(P) and GVA(I) at Current Prices (£m): All Industries

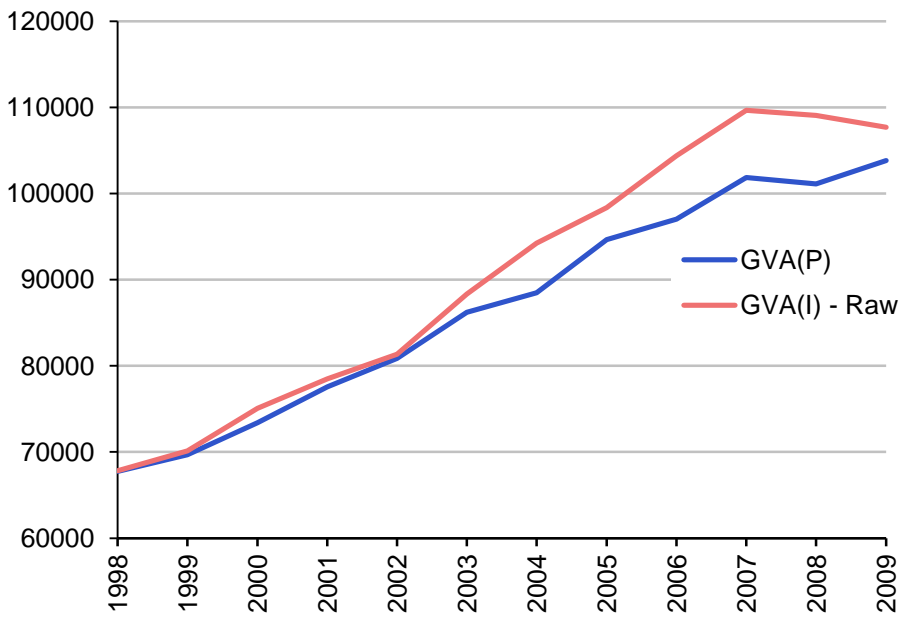


GVA(P) Constant Price Index (2008 = 100): All Industries

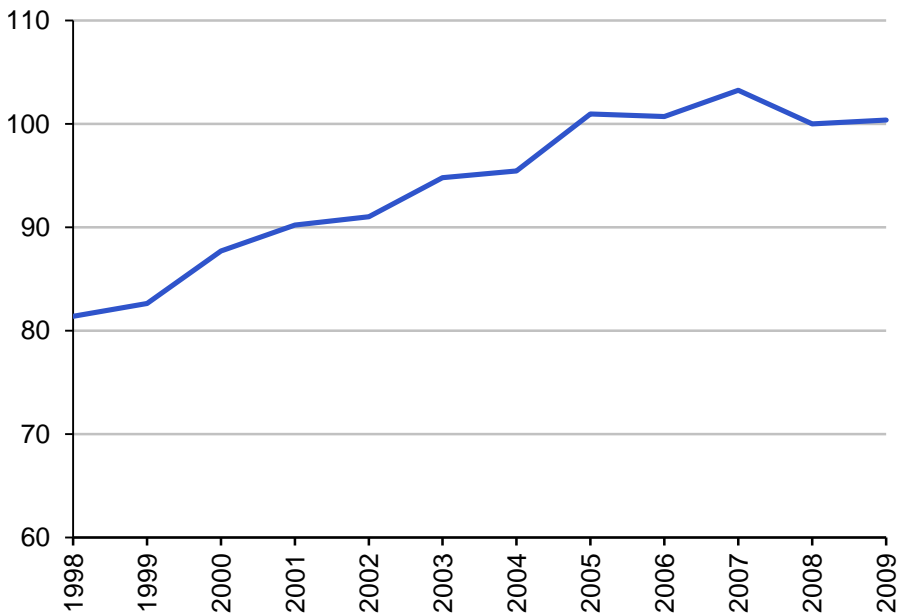


East of England

GVA(P) and GVA(I) at Current Prices (£m): All Industries

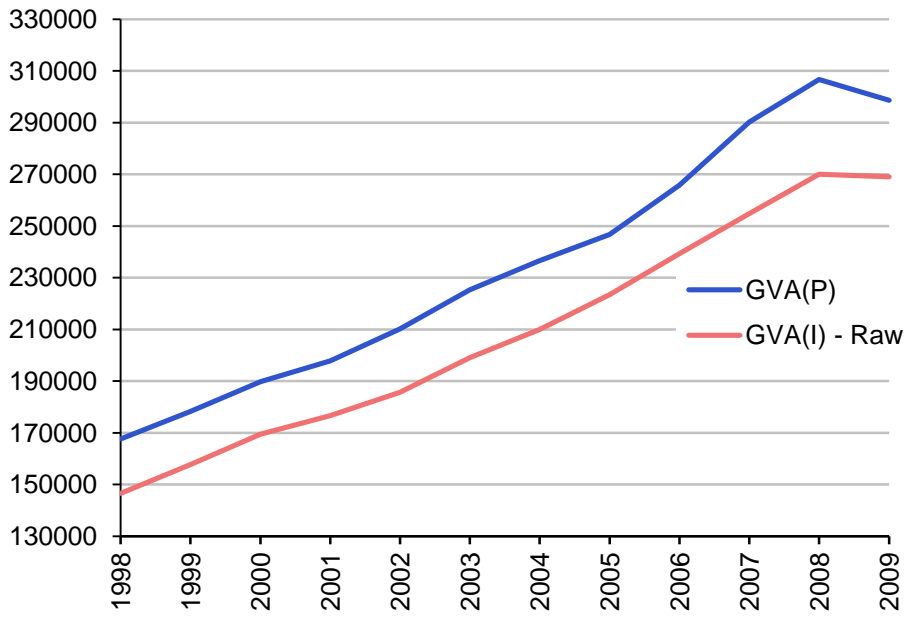


GVA(P) Constant Price Index (2008 = 100): All Industries

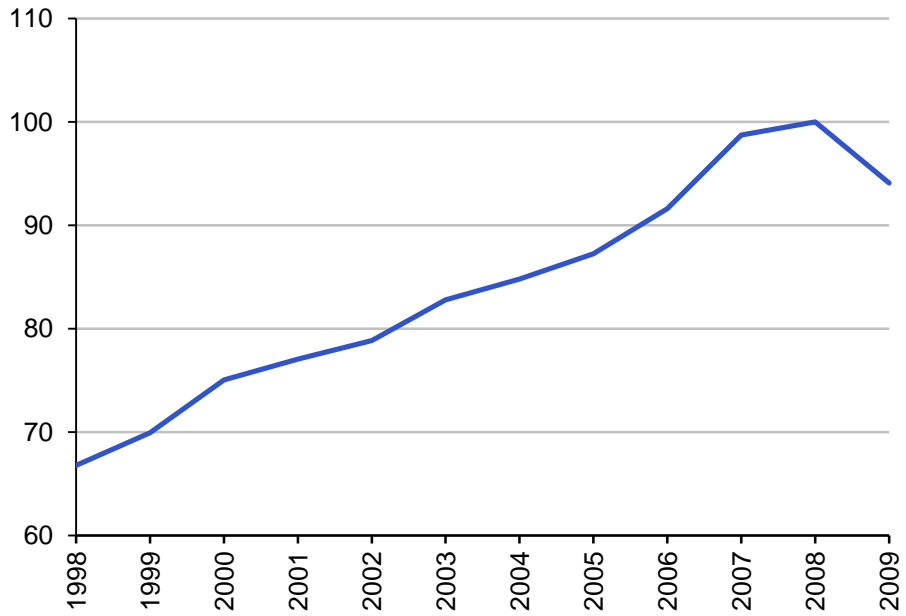


London

GVA(P) and GVA(I) at Current Prices (£m): All Industries

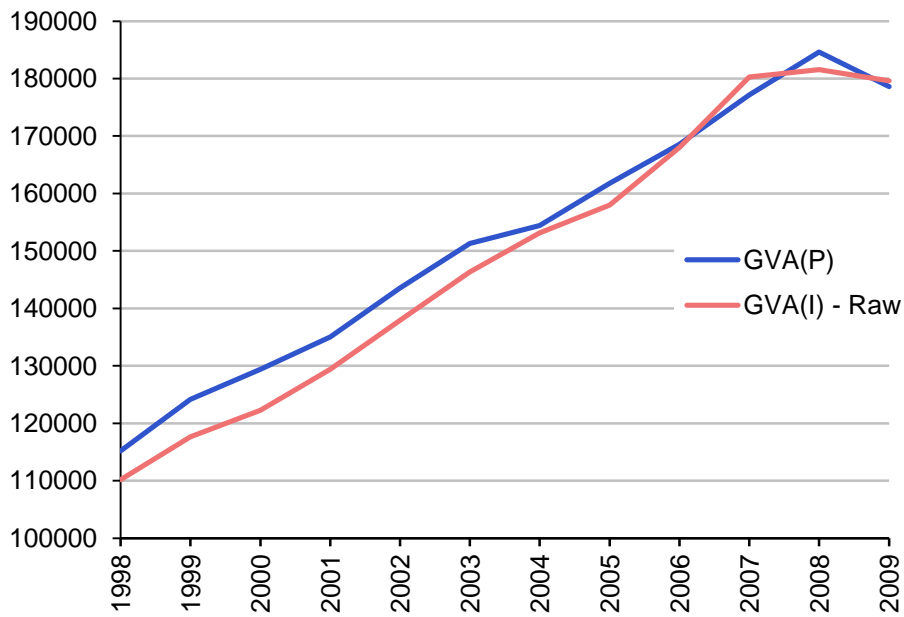


GVA(P) Constant Price Index (2008 = 100): All Industries

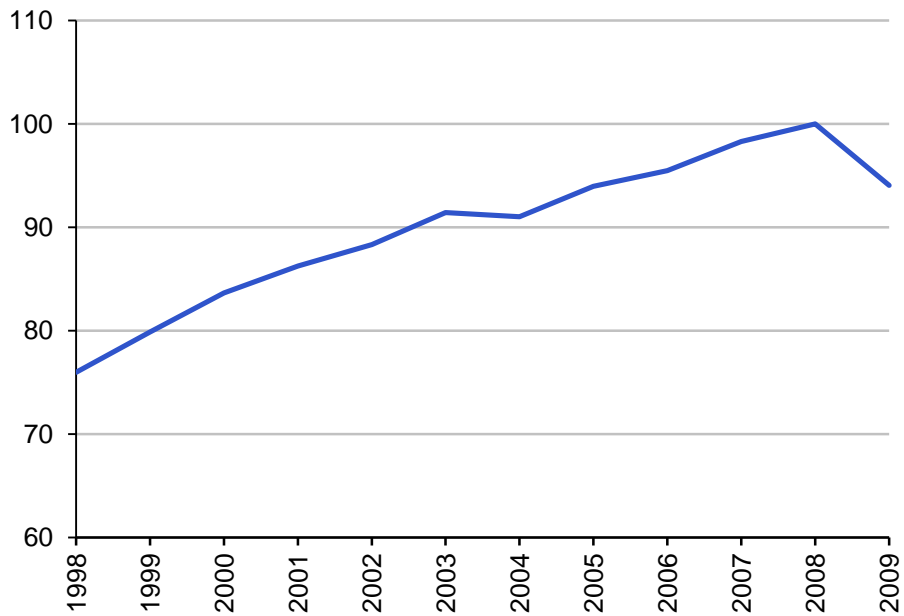


South East

GVA(P) and GVA(I) at Current Prices (£m): All Industries

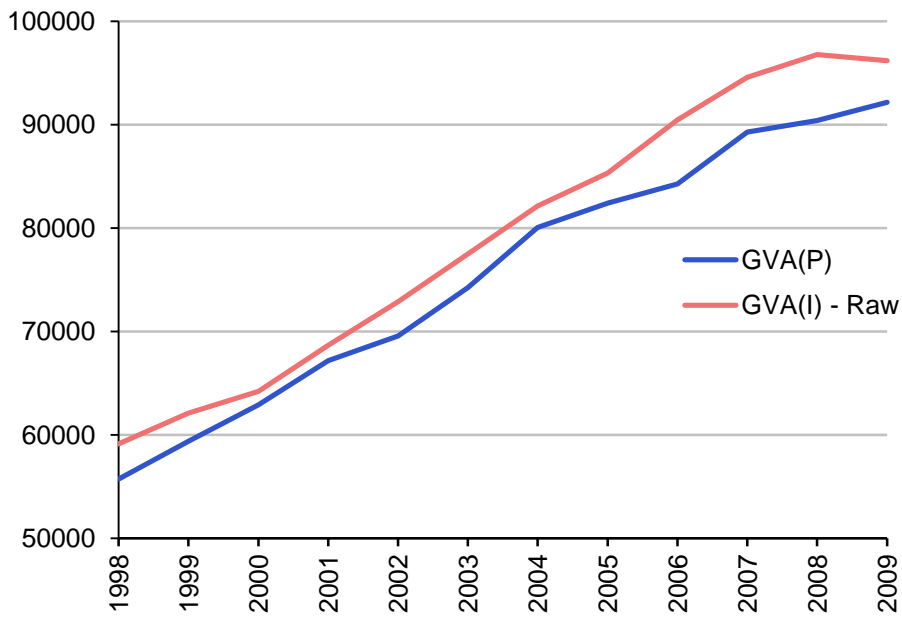


GVA(P) Constant Price Index (2008 = 100): All Industries

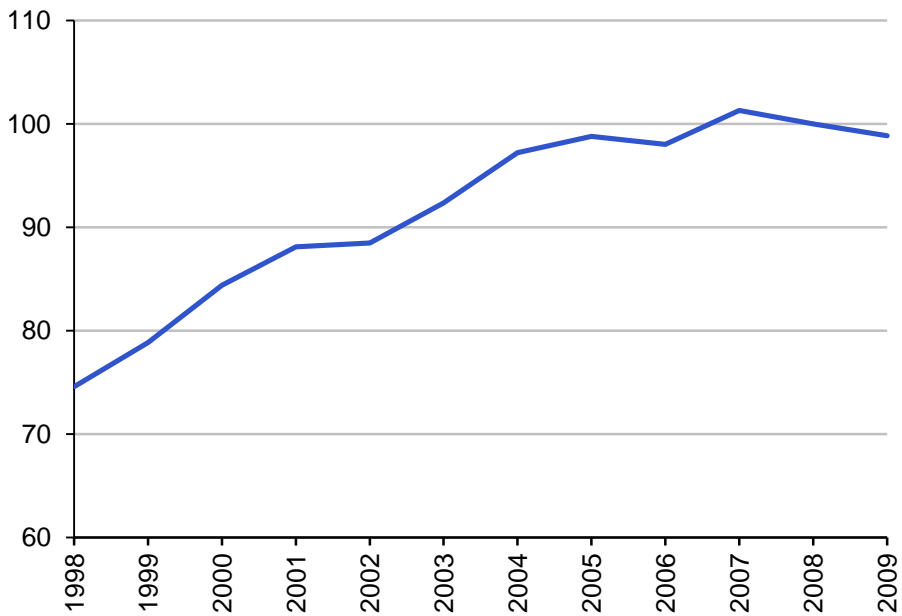


South West

GVA(P) and GVA(I) at Current Prices (£m): All Industries

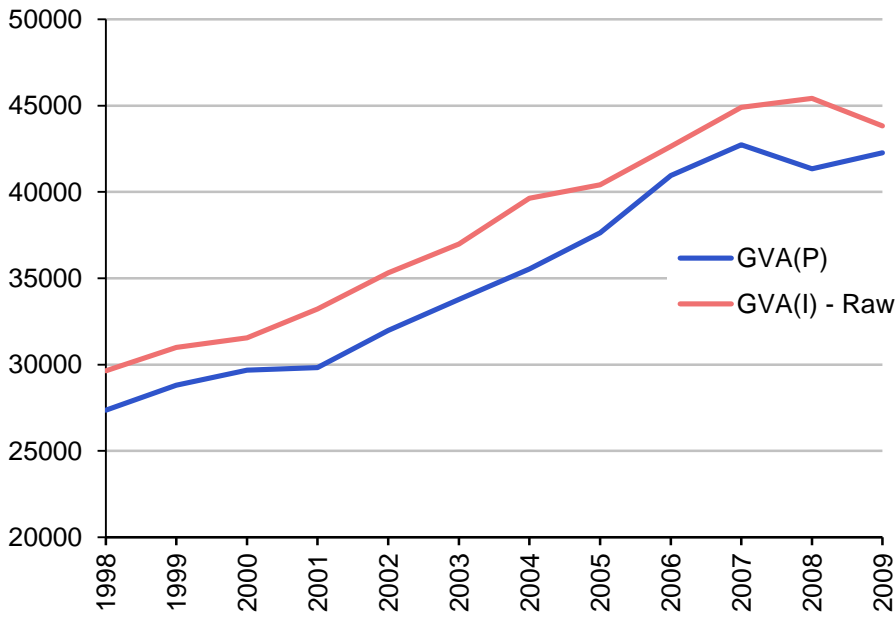


GVA(P) Constant Price Index (2008 = 100): All Industries

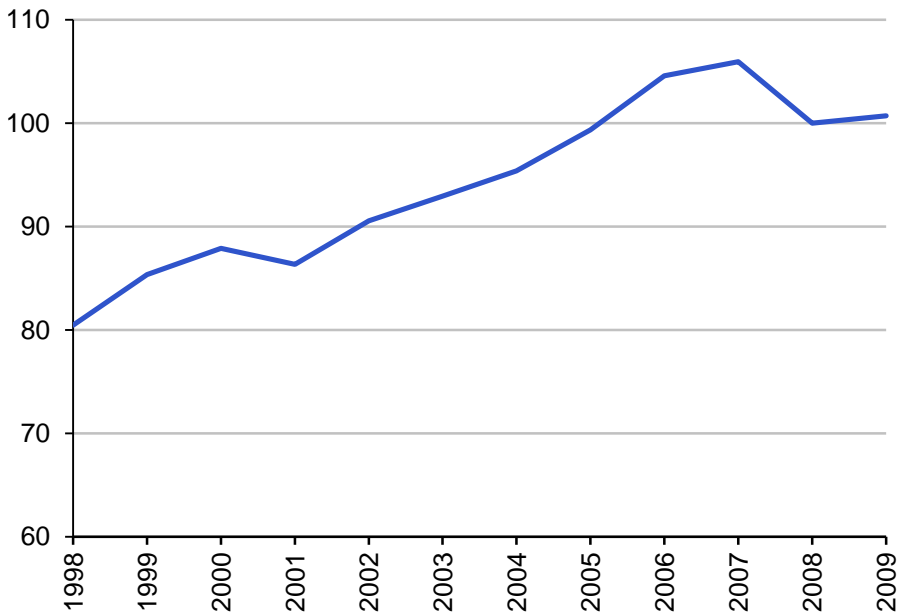


Wales

GVA(P) and GVA(I) at Current Prices (£m): All Industries

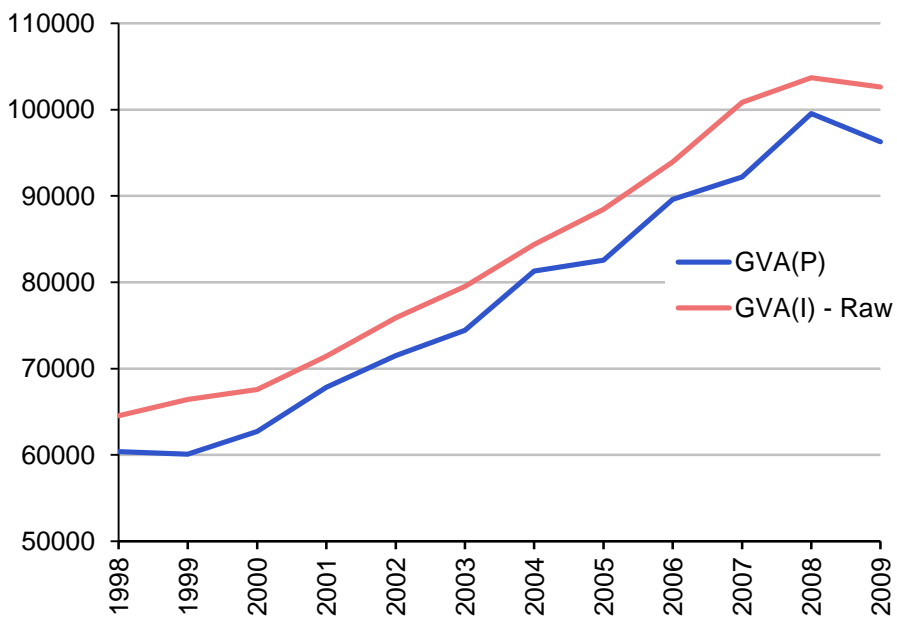


GVA(P) Constant Price Index (2008 = 100): All Industries

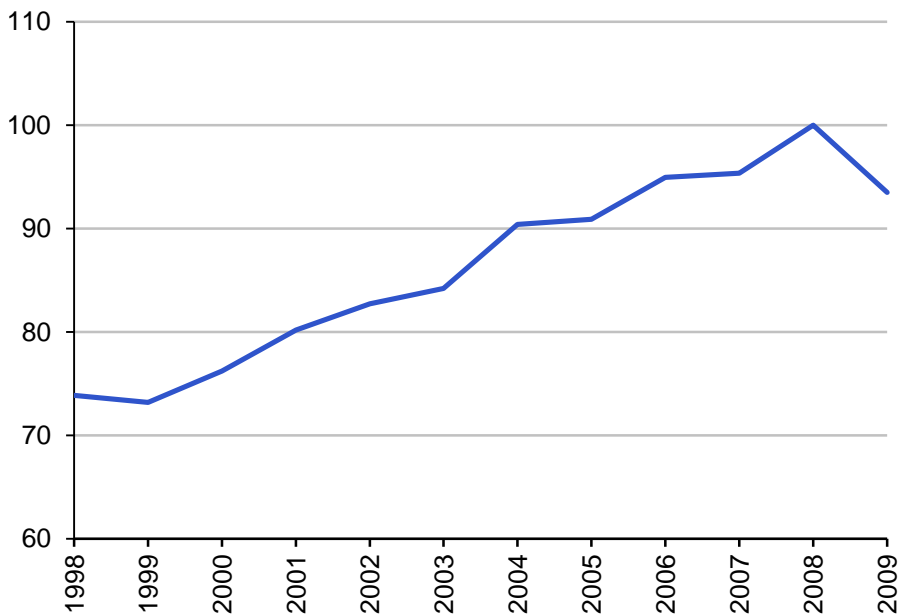


Scotland

GVA(P) and GVA(I) at Current Prices (£m): All Industries

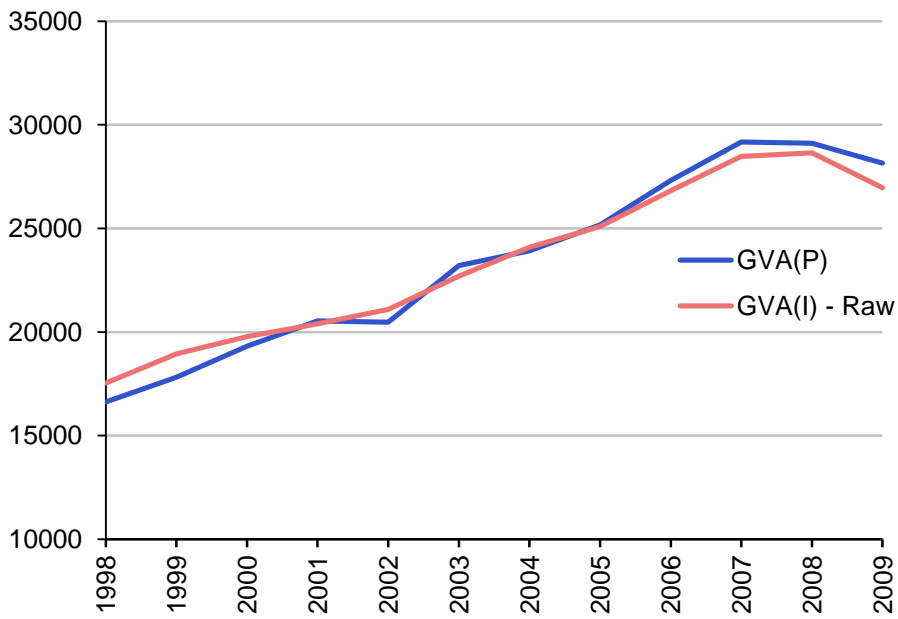


GVA(P) Constant Price Index (2008 = 100): All Industries

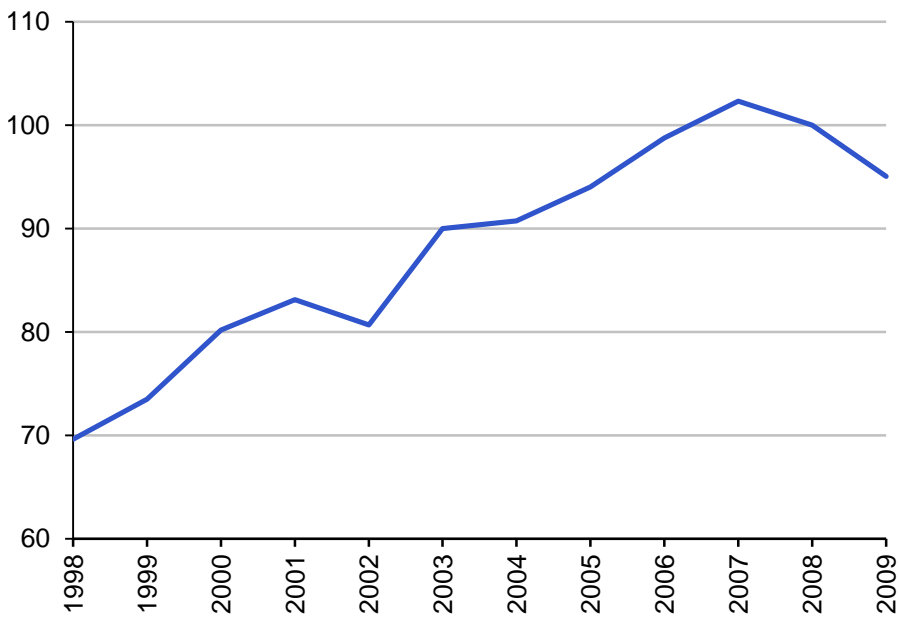


Northern Ireland

GVA(P) and GVA(I) at Current Prices (£m): All Industries

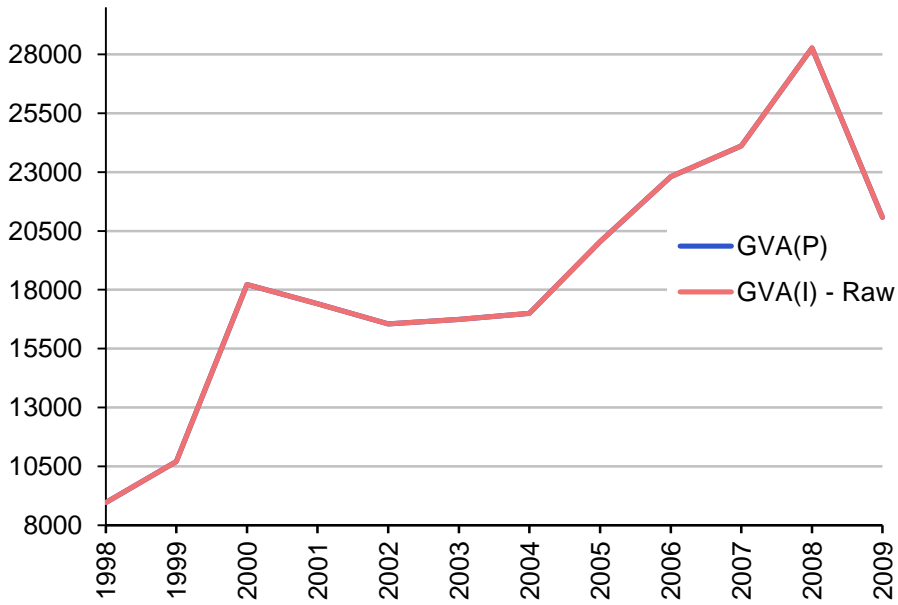


GVA(P) Constant Price Index (2008 = 100): All Industries

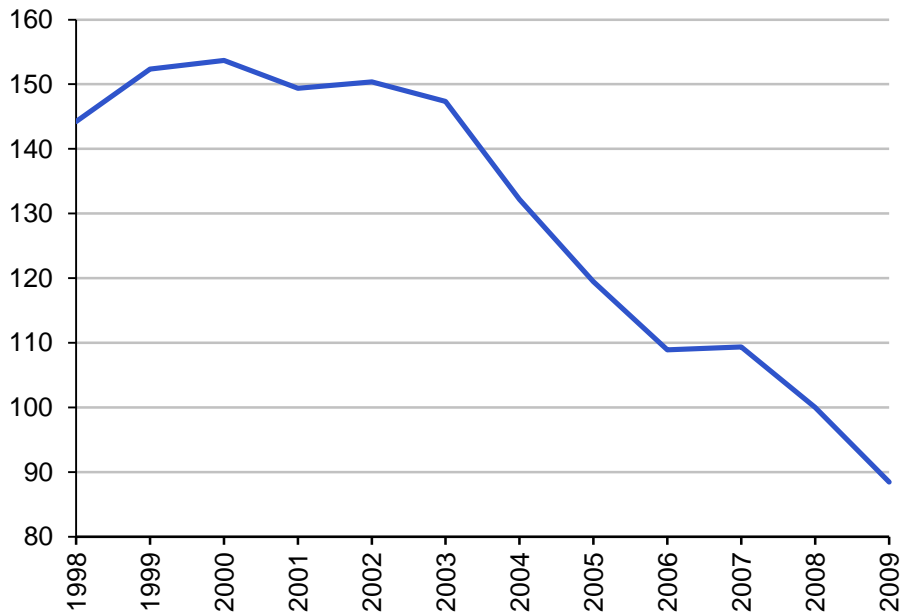


Extra-Regio

GVA(P) and GVA(I) at Current Prices (£m): All Industries



GVA(P) Constant Price Index (2008 = 100): All Industries



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