

CONSTRUCTION IN THE INDUSTRIAL CLASSIFICATION SYSTEM

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Topics

- The national accounting framework
- The International Standard of Industrial Classification of All Economic Activities (ISIC)
- Three national variants and 41.1:
 - Australian and New Zealand System of Industrial Classification (ANZSIC)
 - Canada's North American Industry Classification System (NAICS)
 - UK Standard Industrial Classification (UK SIC) and NACE Rev 2
- The three areas of strong implications

$$\text{GDP} = \text{C} + \text{I} + \text{G} + \text{NX}$$

- National accounts are the annual publication of a country's statistical collections relating to economic activity.
- The estimates of national production, income and output – the triple identity – bring together consumer expenditure, government revenues and expenditures, savings and investment, imports and exports and the balance of payments.
- This has become statistical system under development for over 70 years, that provides a useful picture of economic structure, defines the data required and simplifies the task of collection.

Revisions

- For many reasons national accounts measures of quantities and values can be inaccurate, and the margin of error will vary from low to high depending on the type of data.
- Conceptual differences among statisticians at different times in different countries also influence these statistics.
- “Given these difficulties, it is easy to understand that conceptual changes are frequent ... One must also ask whether it is the constantly changing nature of the economy that calls for these conceptual revisions or whether they are an expression of our inability to settle conceptual issues” (Morgenstern 1963: 7)

SNA

- The internationally accepted standard for presentation of national accounts is the United Nations System of National Accounts (UN SNA 1963, and much revised since).
- This lays out guidelines for the methods to be used in data collection and analysis, which are then interpreted and applied by individual countries, with idiosyncratic results.
- The conventions followed in collection and definition of data differ between countries, affecting international comparisons. Also, data methodologies change within countries, which further complicates the long-term analysis necessary in estimation of trends.

Measurement

- The physical units of output of economic activity are not standardised or homogeneous, and non-standard products are a problem for output measurement.
- Dynamic economies have frequent improvements in quality across many different products, new products and services are constantly invented and introduced, old models are discontinued, and some products are custom built.
- The building and construction industry is an archetype of an industry with non-standardised products, other industries are shipbuilding, aircraft manufacture and many professional services.

ISIC

- The macroeconomic aggregates in the national accounts are at too high a level to capture all economic activity, particularly the activity of companies (in the market sector) and other organisations (in the non-market sector, such as health or non-profit).
- An industry classification system collects companies and organisations into groups with similar characteristics.
- The first Standard Industrial Classification of All Economic Activities (SIC) was the US in 1937, with the United Nations International Standard Industrial Classification (ISIC) following in 1948. This had its most recent revision in 2008.

SIC Codes

- Economic activities are subdivided in a four-level structure with the highest level alphabetically coded sections.
 - Sections subdivide productive activities into broad groupings such as “Agriculture, forestry and fishing” (A), “Manufacturing” (C) and “Information and communication” (J).
- The classification is then organized into numerically coded categories, which are two-digit divisions, three-digit groups, and, four-digit classes (which have the greatest level of detail).
- SIC codes are therefore four-digit numbers representing industries, on the basis of common characteristics in products, services, production processes and logistics systems between members.

Section	Divisions	ISIC Industry
A	1-3	Agriculture, forestry and fishing
B	5-9	Mining and quarrying
C	10-33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36-39	Water supply; sewerage, waste management and remediation
F	41-43	Construction
G	45-47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49-53	Transportation and storage
I	55-56	Accommodation and food service activities
J	58-63	Information and communication
K	64-66	Financial and insurance activities
L	68	Real estate activities
M	69-75	Professional, scientific and technical activities
N	77-82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86-88	Human health and social work activities
R	90-93	Arts, entertainment and recreation
S	94-96	Other service activities
T	97-98	Activities of households as employers; undifferentiated activities of households for own use
U	99	Activities of extraterritorial organizations and bodies

Section F

- Construction in the ISIC includes three groups:
 - The complete construction of buildings (division 41)
 - The complete construction of civil engineering works (division 42)
 - Specialized construction activities or special trades, if carried out only as a part of the construction process (division 43)
 - Plus repair of building and engineering works.
- Generally, most countries have a similar structure at the two and three digit levels.

Comparison

F	ISIC Rev 4	E	ANZSIC 2006
41	Construction of buildings	30	Building construction
410	Construction of buildings		
4100	Construction of buildings	3011	House construction
		3019	Other residential building construction
		3020	Non-residential building construction
42	Civil engineering	31	Heavy and civil engineering construction
421	Construction of roads and railways		
4210	Construction of roads & railways	3101p	Road and bridge construction
		3109p	Other heavy and civil engineering
		3299p	Other construction services n.e.c.
422	Construction of utility projects		
4220	Construction of utility projects	3109p	Other heavy and civil engineering
429	Construction of other civil engineering projects		
4290	Construction of other civil engineering projects	3101p	Road and bridge construction
		3109p	Other heavy and civil engineering
		3211p	Land development and subdivision

United Nations ISIC	ANZSIC	United Kingdom SIC	Canada NAICS
<i>Section F Construction</i>	<i>Section E Construction</i>	<i>Section F Construction</i>	<i>23 Construction</i>
4100 Construction of buildings	30 Building construction	41 Construction of buildings	236 Construction of Buildings
		41.1 Development of building projects	
Single-family houses	301 Residential building construction	41.202 Construction of domestic buildings	2361 Residential building construction
Multi-family buildings, including high-rise buildings			
Construction of all types of non-residential buildings	302 Non-residential building construction	41.201 Construction of commercial buildings	2362 Non-residential building construction
Buildings for industrial production			23622 Commercial and institutional building
42 Civil engineering	31 Heavy and civil engineering construction	42 Civil engineering	237 Heavy and civil engineering construction

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UK is Different

- The 2007 revision introduced a new subdivision, SIC 41100 The Development of Building Projects.
- This subdivision employed 86,130 people and turned over £25,833,691 in 2011.
- Compare to non-residential and residential construction employing approximately 1.4 million people and turning over more than £200 billion in 2011.

In Or Out?

- This UK class includes “development of building projects for residential and non-residential buildings by bringing together financial, technical and physical means to realise the building projects for later sale”.
- ISIC has no such activity within the construction industry.
- ANZSIC has SIC code 3211 for Land development and site preparation, but this excludes firms subdividing land without site preparation.
- NAICS has SIC code 2372: Land subdivision. However, 23721 excludes much of what is included in 41100 and is more similar to ANZSIC.

EU System

- NACE Rev 2 from 2008 is the statistical classification of economic activities in the European Community. Also used by the UK.
- Section F includes general construction and specialised construction activities for buildings and civil engineering works. It includes new work, repair, additions and alterations, erection of prefabricated and temporary buildings.
- NACE classifies services to buildings and landscape activities under administrative and support service activities, not construction. Cf. ANZSIC classifies landscaping under construction.

NACE

- Also here is 41.1 Development of building projects: “for buildings or civil engineering works by bringing together financial, technical and physical means to realise the construction projects for later sale”. This is the same as UK’s Group and Class 41.10.
- If these activities are carried out not for later sale but for their operation (e.g. rental of space, manufacturing activities), the unit would not be classified here but according to its operational activity (i.e. real estate, manufacturing).
- Architectural and engineering activities are in 71.1, which includes “the provision of architectural services, engineering services, drafting services, building inspection services and surveying and mapping services and the like.” Also includes project management services related to building projects.

Implications

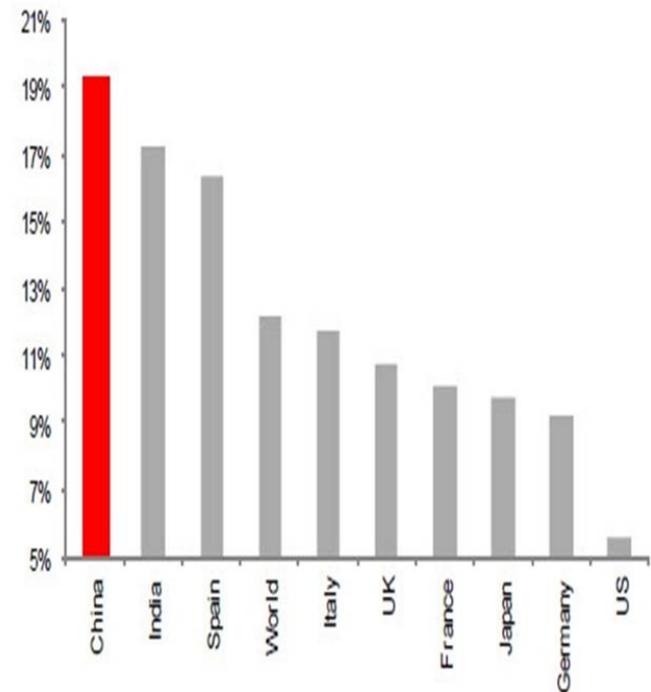
There are three areas where these decisions on definitions and membership have strong implications.

1. International comparisons of GDP shares.
2. Contributions to growth and the effect on the business cycle of fluctuations in construction output.
3. The fundamental issue: Where are the boundaries of the firm, industry and market?

International Comparisons

- Share of GDP and employment affected by inclusions and/or exclusions.
- A broad 'built environment sector' would be a better basis for comparison: Materials + equipment + components + site work + services = BES.

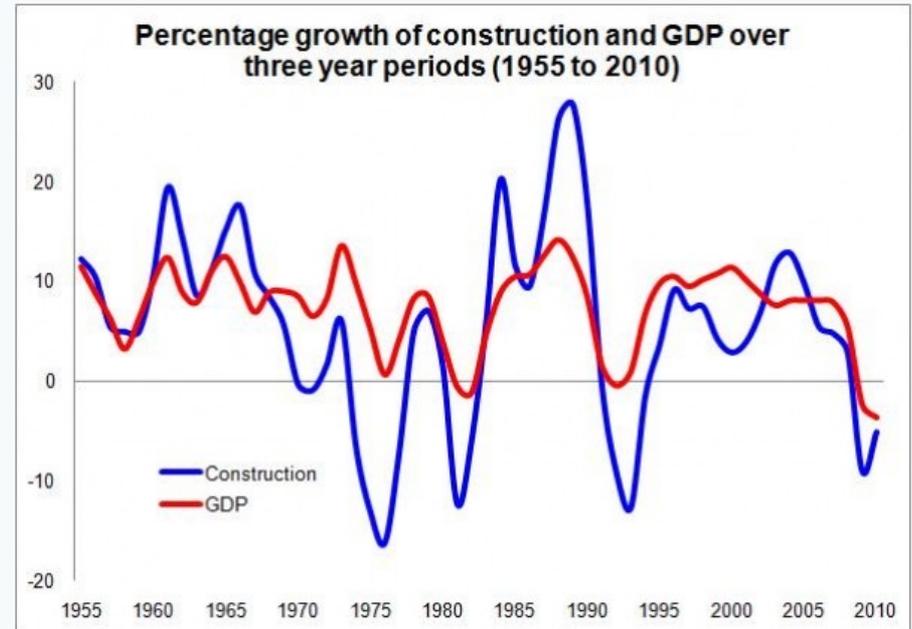
Construction as % of GDP - China stands well ahead



Source: SG Cross Asset Research, IMF, Global Insight

Contribution to Growth

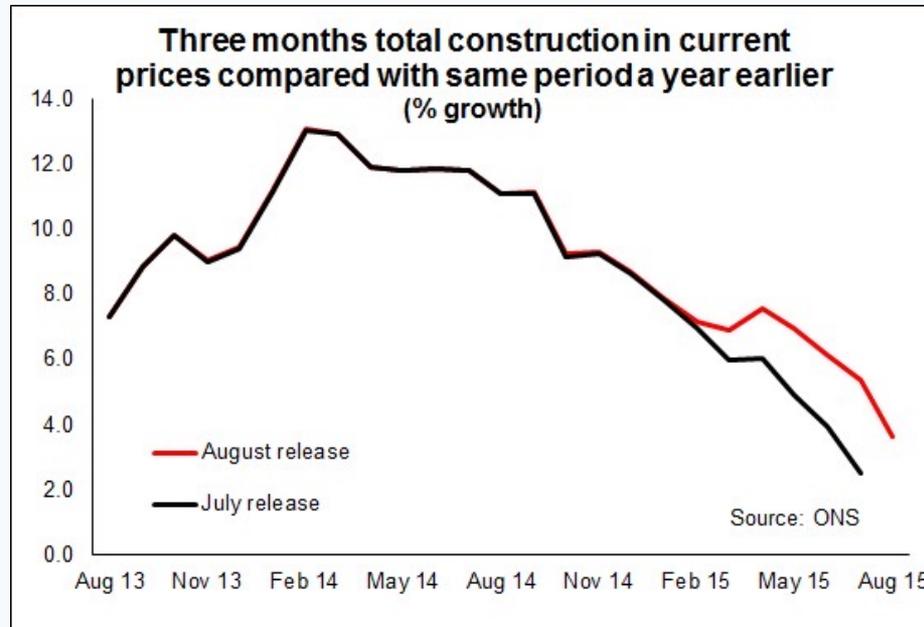
- Investment is the most volatile component of GDP.
- Construction is the most variable part of investment.
- Non-residential building typically varies the most.



Boundaries

- Where are the boundaries of firms, industries and markets? This is the big issue in industry economics.
- In construction statistics a lot of work is excluded, such as:
 - Buildings for own use by industry, e.g. retailers like Westfield that construct their own buildings.
 - Work done inside public sector organisations by their own employees.
 - Most professional services are outside construction.
 - Repair and maintenance is not counted.
 - International contractors get classified differently across countries (e.g. Lend Lease in UK and Australia).

UK Statistics



The chart is a comparison of the three months total of UK construction output with the total over the same period a year earlier. The black line is the original data from July, the revised red line was in the August release from the ONS a month later.

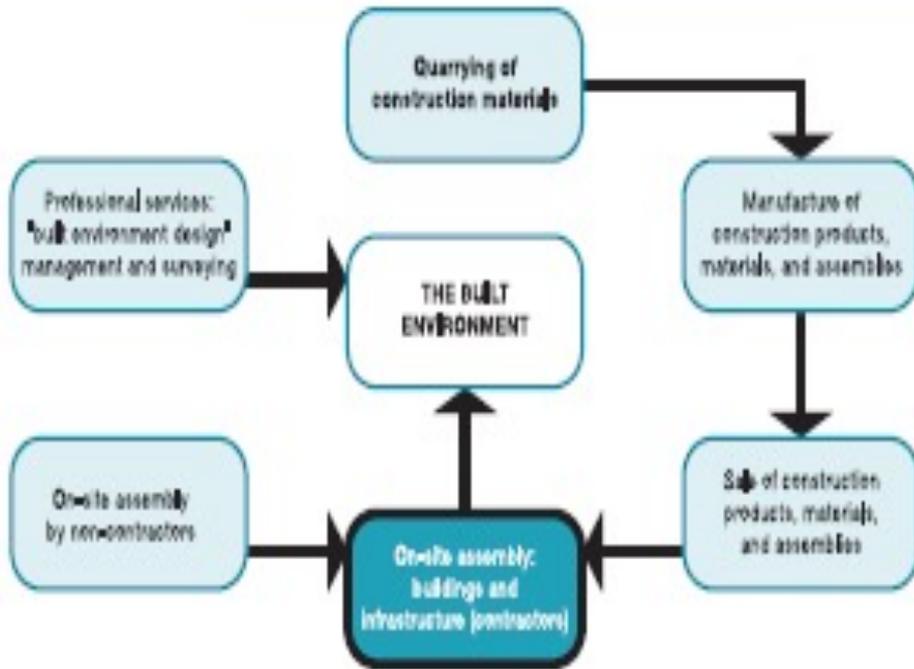
What is being measured?

- “An error was found in table 5 of the statistical bulletin for Output and New Orders in the Construction Industry, April 2015 and Q1 2015. The error concerns the GDP quarter on same quarter a year ago growth rates misquoted as a result of a spreadsheet error.”
- The revisions added £1.5 billion to turnover in the months March to July, about 2.4% more. Over £1 billion of the revisions were in the infrastructure sector, boosting estimated output by more than 10%.
- The ONS reallocated a major business from the services sector to construction (the firm’s turnover could be £3 billion, but its name is confidential). The work had previously been allocated to services.

Defining the Industry

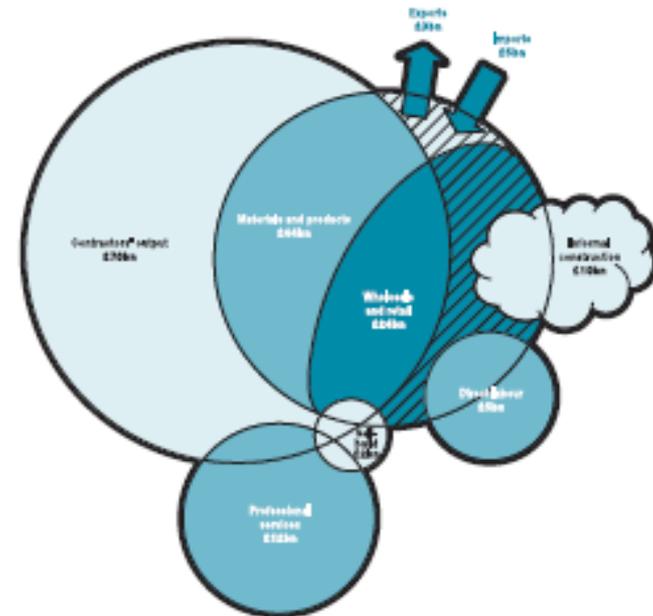
- Official statistics on the output of the construction industry capture on-site activities of contractors and subcontractors. However, construction links suppliers of materials, machinery, products, services, and other inputs into the built environment.
- These two views have been called broad and narrow, with the narrow industry defined as on-site work and the wider industry as the supply chain of materials, products and assemblies, plus professional services such as management, architecture, engineering design and surveying.

Figure 3.1 Broad and narrow Industry structures



Gross output was found for SIC three digit industry groups then added to get the estimate for the broad industry below.

Figure 3.2 The overall gross output of the UK construction industry



Pearce, D. 2003. *The Social and Economic Value of Construction: The Construction Industry's Contribution to Sustainable Development*, nCrisp, London.

Broad Industry is Twice the Size

Industry	No. of firms	Share of value added
Contractors	192,404	52%
Mining and quarrying of construction materials	2,248	2%
Manufacture of construction products	20,863	15%
Sale of construction products	81,997	15%
Professional services	57,636	16%

SIC	Industry	Turnover	GVA at basic prices	Purchases	Employment costs	Employment during year
F	Construction	57	55	58	52	57
C	Quarrying	2	2	2	2	1
D	Manufacturing	18	18	18	20	19
G	Trade	10	6	13	7	6
K	Real estate, renting and business activities	13	19	10	20	17
	Total (percentage)	100	100	100	100	100

Final Thoughts

- This year's Noble Prize for Economics went to Angus Deaton, mainly but not only for his work designing and running household surveys for the World Bank.
- Mr. Deaton's signature achievement was to make empirical researchers pay closer attention to questions of measurement.
- Data are imperfect, surveys can be unrepresentative, people misreport, and attempts to recontact survey participants often fail. Mr. Deaton confronted these issues head-on, and he taught economists how to extract meaning from imperfect data.