
**Centre for Global Higher Education
UCL Institute of Education
29th September 2016**

University of
Huddersfield
Inspiring tomorrow's professionals

MERGERS IN HIGHER EDUCATION: IMPLICATIONS FOR EFFICIENCY

**Jill Johnes
University of Huddersfield**



Outline of talk

- Introduction
 - Background
 - Reasons for merger in higher education
 - Previous evidence on the consequences of mergers
 - Measuring efficiency – a brief overview
 - Summary of results – from 3 papers
 - Conclusions
-

Various forms of relationships can be observed in the English higher education (HE) sector:

- shared purchasing and services
- joint ventures and alliances
- full merger

This paper is concerned only with merger:

- ‘Merger: two or more partners combining to create a single institution, which may retain the name and legal status of one of them or be an entirely new legal entity.’
(HEFCE 2012, p11)

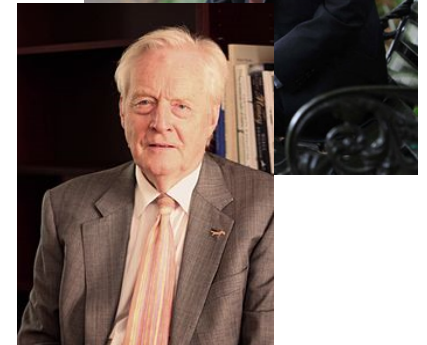
Introduction

- The current economic climate puts pressure on publicly-funded sectors to deliver more for less – including English HE
- Funding cuts can be absorbed by efficiency savings – possibly achieved by mergers (*the efficiency theory*)

‘If institutional failure cannot be prevented ..., then the Council will explore options such as mergers or takeovers led by other providers so that the institution in a new form becomes a going concern.’ (The Browne Report 2010 p46)

‘Throughout the world concentration of research funding is the game,... How can you possibly compete as a single institution?’
Steve Smith, vice-chancellor of Exeter University, reported in (16th October 2012)

Sir Roderick Floud former president of Universities UK believes that the number of universities in the UK should be cut by “at least one-third if not one-half”
(*THE* 19-25 June 2014)



Some questions:

- Does the merger of 2 (or more) HEIs cause an increase in subsequent efficiency?
- Do the efficiency effects of merger take time to reap?

Some problems:

- Measuring efficiency
- Comparatively few mergers in English higher education
- Merger activity and efficiency may be endogenous – i.e. merger leads to efficiency, but the existence of inefficiency may lead to merger.
- Conventional econometric techniques of analysis may not be appropriate

Background

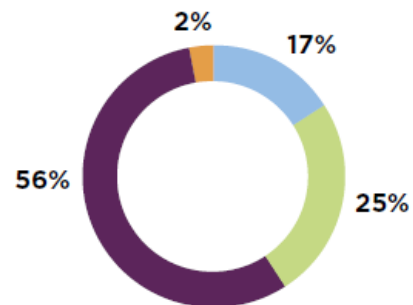
Mergers in English HE

- Mergers in English HE have varied in HEI composition
- They have largely been HEI-motivated
- This contrasts with the experience in other countries eg. Wales:
 - “The Welsh government has stepped in to reduce the number of universities in Wales; maybe the English government will have to do the same.”
 - “...experience suggests that universities [in England] will not make such radical changes for themselves...”
Sir Roderick Floud, THE 19-25 June 2014

Background

The future?

HE leaders' predictions for the next 5-10 years



A number of institutional failures and insolvencies



Boxall and Woodgates (2014)

Reasons for merger in HE

1. Efficiency theory

A merger will occur if the merging HEIs believe they can be run more efficiently and effectively together than separately

- **Economies of scale** (Fielden and Markham 1997; Skodvin 1999; Patterson 2000; Kyvik 2002; Norgård and Skodvin 2002; Teixeira 2007; Green and Johnes 2009)
- **Economies of scope** (Patterson 2000; Harman 2000; Harman and Meek 2002; Kyvik 2002; Harman and Harman 2003; Aarrevaara 2007; Teixeira 2007)

Prediction: merger leads to lower inefficiency

2. Strategy motive

- A merger will occur for reasons of **survival and/or growth** for at least one of the participants (Pritchard 1993; Rowley 1997; Harman and Meek 2002; Harman and Harman 2003)

Prediction: inefficiency leads to merger

Strategy motive (continued)

- A merger will occur to enhance **reputation** (Skodvin 1999; Engwall 2007; Harman and Harman 2008; Tirronenen and Nokkala 2009; Aula and Tienari 2011)
- A merger will occur to improve **international competitiveness** (Mok 2005; Tirronenen and Nokkala 2009)

Prediction: merger leads to lower inefficiency

- Efficiency theory is the main underlying cause of merger activity in GB (Rowley 1997)

Reasons for merger in HE

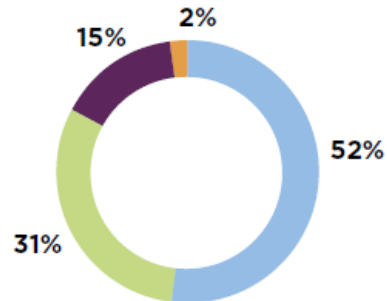
Evidence in the UK HE context

- Economies of scale:
 - are just exhausted for the typical HEI (Johnes 1997; Izadi *et al* 2002; Johnes *et al* 2005; Johnes *et al* 2008; Johnes & Johnes 2009)
 - are unexhausted for small HEIs (Johnes & Johnes 2016)
- Economies of scope
 - are just exhausted or decreasing for the typical HEI (Glass *et al* 1995a; 1995b; Johnes 1997; Izadi *et al* 2002; Johnes *et al* 2005; Johnes *et al* 2008; Johnes and Johnes 2009)

Reasons for merger in HE

Evidence in the UK HE context

HE leaders' predictions for the next 5-10 years



A 'de facto' super league
of dominant institutions



Boxall, M. and P. Woodgates (2014).

Reasons for merger in HE

- **Evidence in the UK HE context**
- ‘Successive studies of higher education in Wales conclude that, in the face of **global competition and increasing marketisation**, the sector will need to address its inherent weaknesses of **fragmentation and lack of scale**, tackle issues surrounding new forms of delivery, and markedly improve its research performance and financial resilience.’ *Department for Children Education Lifelong Learning and Skills (Wales) (2011).*

Case studies:

- Failure rate of HE mergers is 10% (Rowley 1997) compared to 25 to 50% in private sector (HEFCE 2012)
- Mergers are successful in the context of non-viable HEIs (Harman & Harman 2003)
- Mergers are more successful if they are geographically close (Skodvin 1999)
- Mergers undertaken for *academic* reasons may not reap rewards in terms of *efficiency* (Skodvin 1999)

Previous evidence

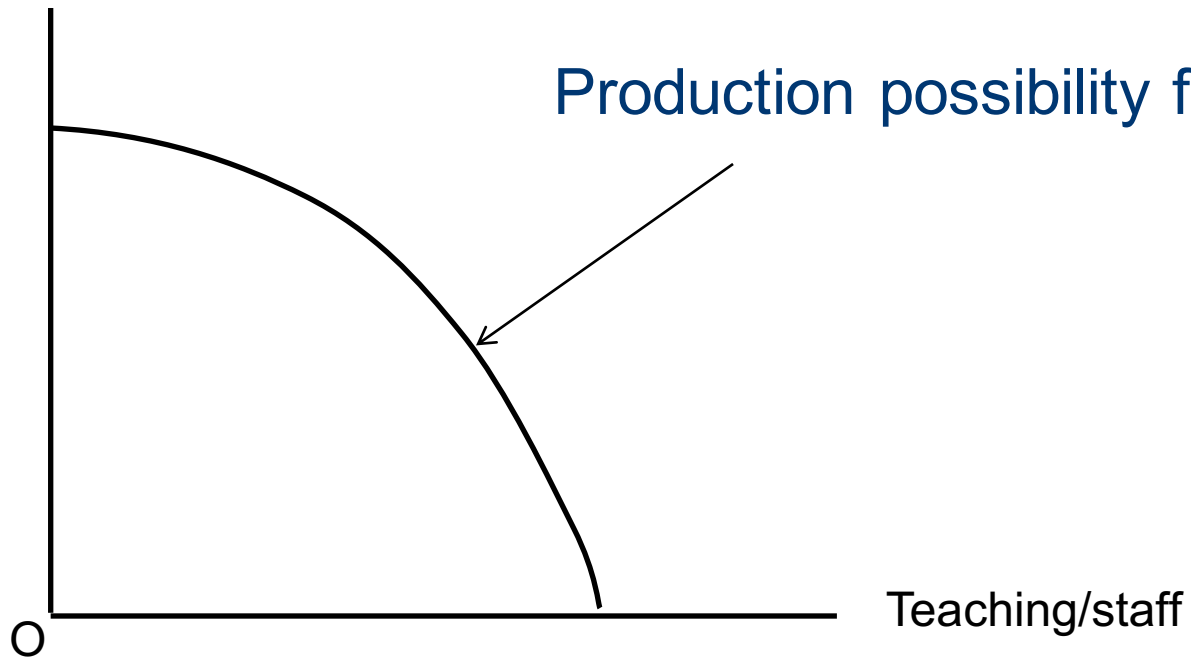
- **Statistical analyses:**
- China (Mao 2009): efficiency and outcomes improved in year following merger; but did not in the second year
- China (Hu & Liang 2008): large rise in mean productivity in merger HEIs in year following merger, but a fall the second year after merger

Statistical analyses: some caveats

- Previous statistical analyses fail to take into account
 - the complex relationship between inefficiency and merger
 - that other underlying characteristics might cause merging institutions to perform differently from non-merging ones
- Any measurement of efficiency typically
 - does not incorporate any loss caused by the merger in learning experience on the part of students or staff
 - does not incorporate any social costs arising from reduction in diversity between HEIs in the sector or regional effects of HEIs

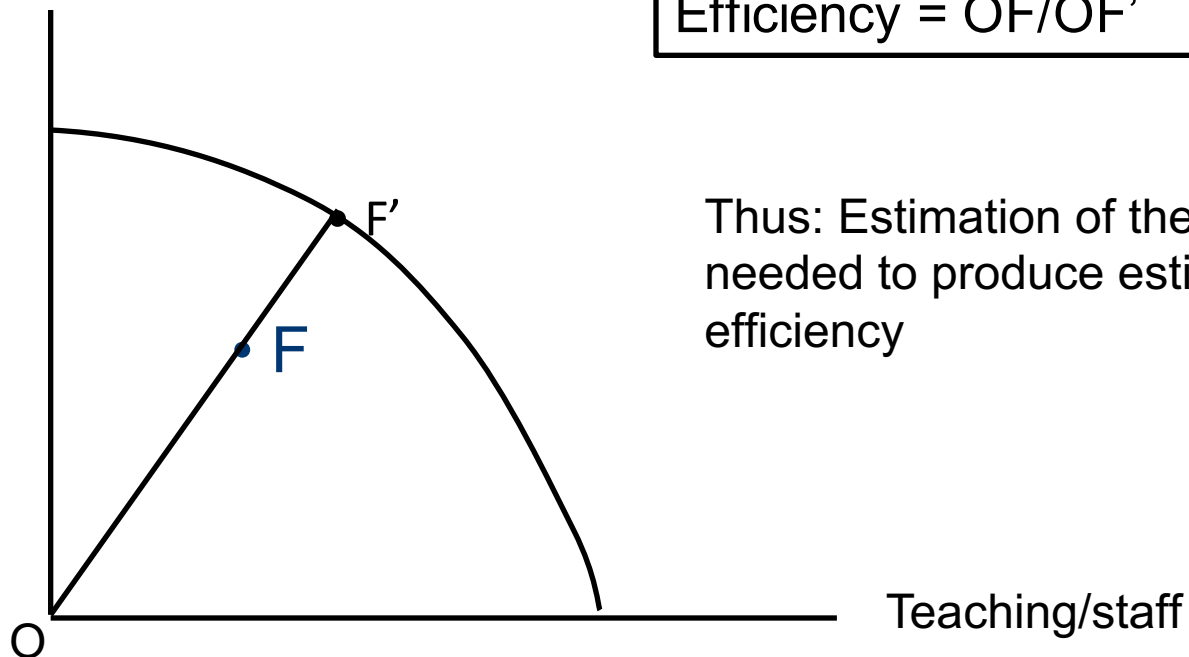
Measuring efficiency

Research/staff



Measuring efficiency

Research/staff



Measuring efficiency

Data envelopment analysis (DEA)

Charnes, Cooper & Rhodes(1978)

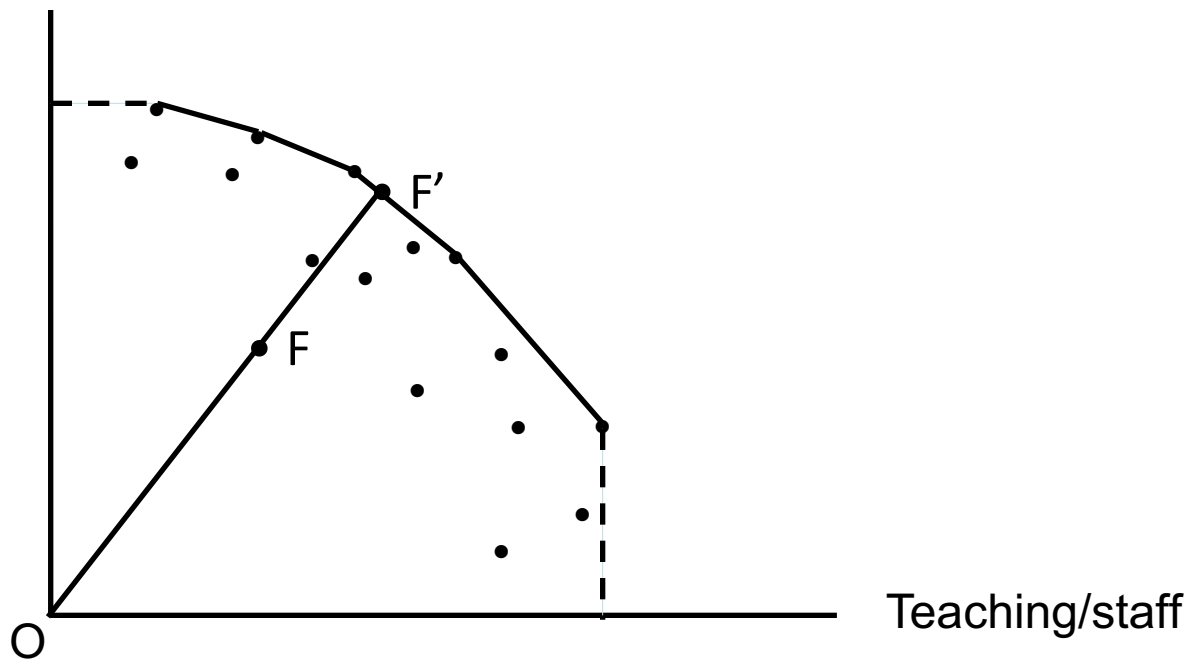


- DEA estimates a piecewise linear frontier using linear programming methods
- No error term; no equation

2. Efficiency and its measurement

Ordinary least squares regression

Research/staff



Measuring efficiency

Stochastic frontier analysis (SFA)

Aigner, Lovell and Schmidt (1977)

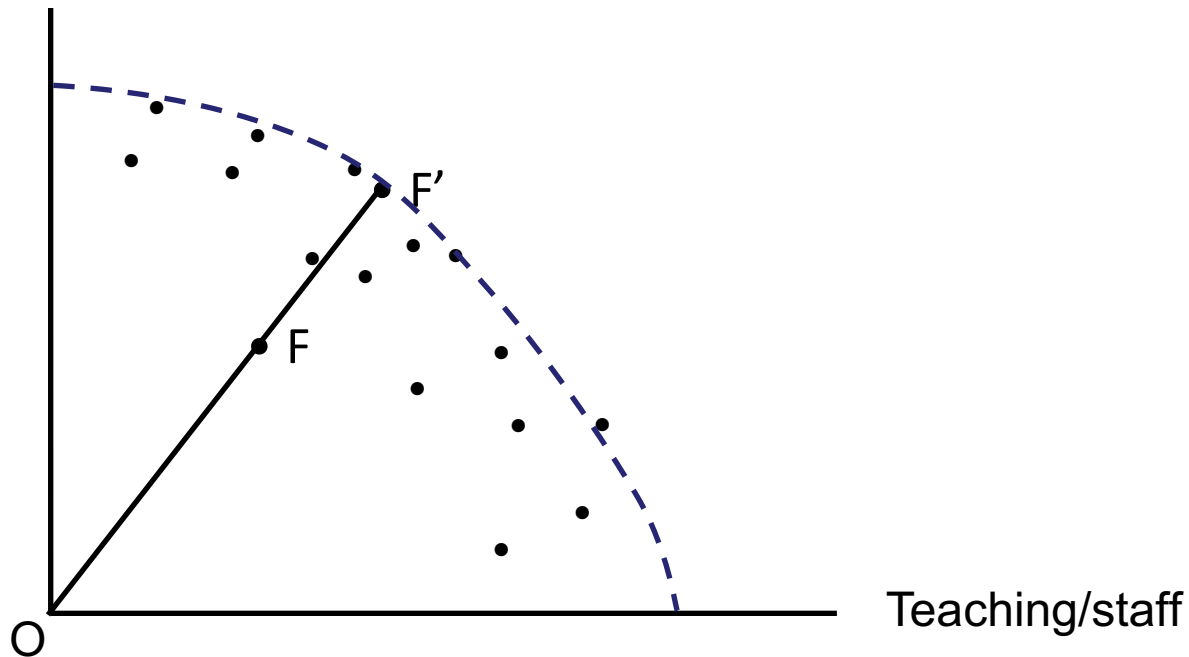


- The error term is split into 2 components:
 - a random error component (as in OLS)
 - a half-normally distributed component to reflect efficiency

2. Efficiency and its measurement

Ordinary least squares regression

Research/staff



Measuring efficiency

Inputs and outputs

Inputs

Primary inputs:

PGINPUT (x_1): Numbers on postgraduate programmes

UGINPUT (x_2): Numbers on undergraduate programmes

Labour:

STAFF (x_3): Number of FTE academic staff

ADMIN (x_5): Expenditure on administration including staff

Capital:

ACSERV (x_4): Expenditure on library and computing facilities

Black
Box

Outputs

Teaching:

PGOUTPUT (y_1): Graduates from postgraduate programmes

UGOUTPUT (y_3): Graduates from undergraduate programmes

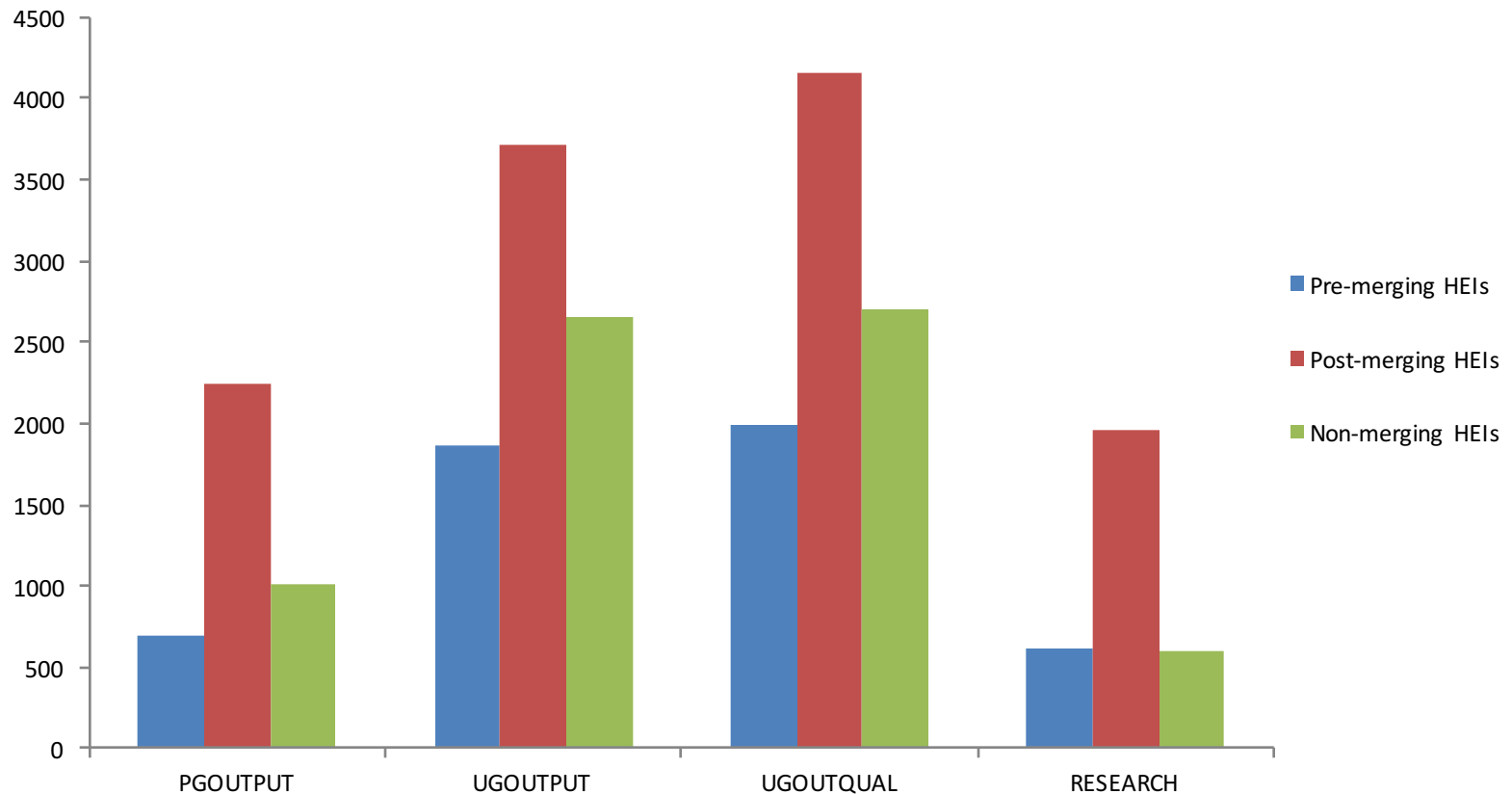
Research:

RESEARCH (y_2): Income received from research grants and contracts

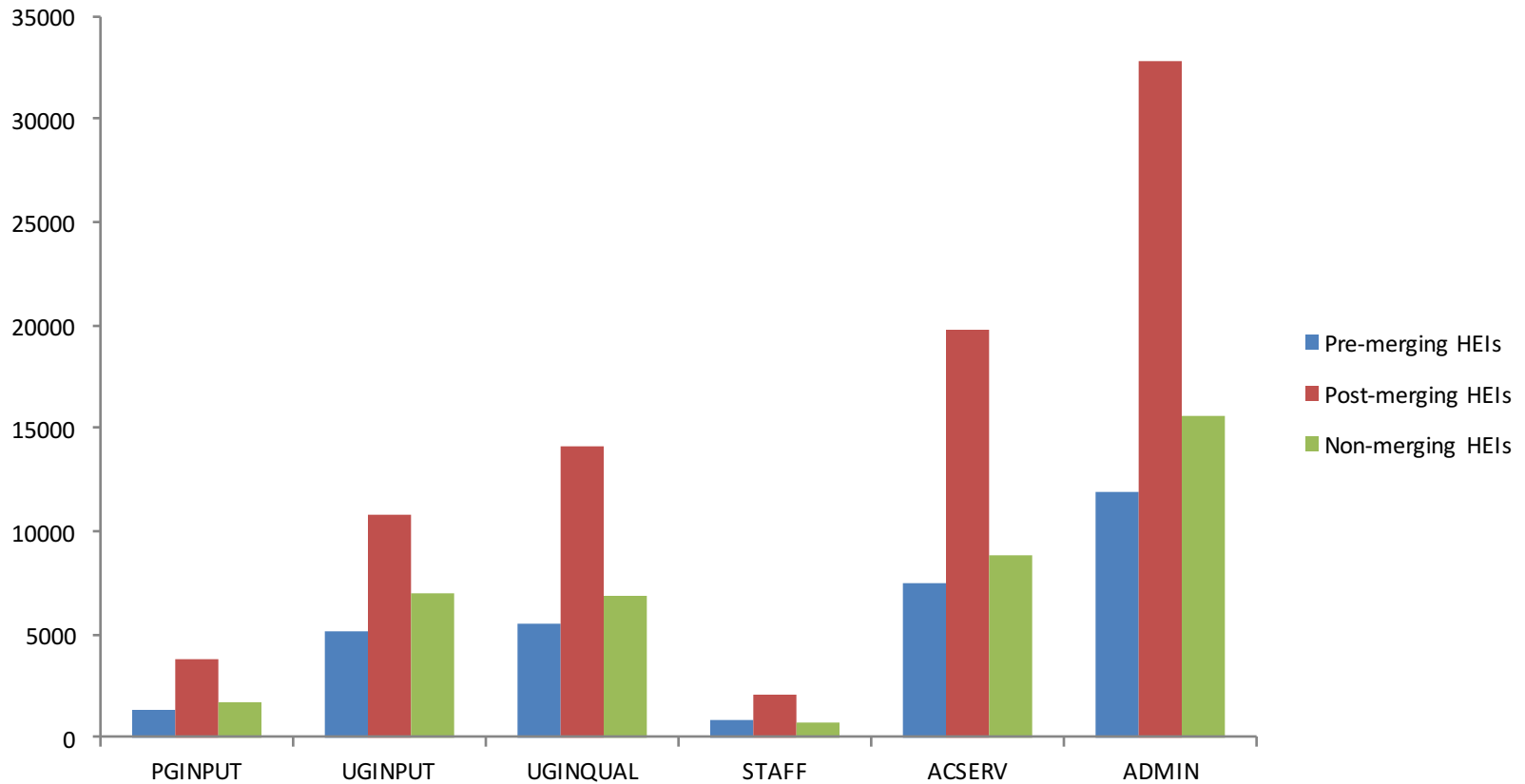
Summary of results 1: Johnes 2014

- Panel of data from 1996/97 to 2008/09 with $n = 1444$ total observations (the number of HEIs varies from 108 to 113 in each year)
- Data from Higher Education Statistical Agency (HESA)
- All money units in 2008 values
- 19 mergers in the data set
- Various efficiency estimation methods (DEA and SFA)
- Merger effects explored using a simple comparison of mean efficiency by pre-, post- and non-merging HEIs

Summary of results 1: Johnes 2014



Summary of results 1: Johnes 2014



Summary of results 1: Johnes 2014

			1996/97 to 2008/9		
<i>Models</i>			<i>Pre-merger</i> <i>n = 142</i>	<i>Post-merger</i> <i>n = 133</i>	<i>Non-merging</i> <i>n = 1169</i>
Parametric	(a)	TI RE	0.744	0.794	0.742
	(b)	TI SFA	0.797	0.890	0.793
	(c)	TVD SFA	0.806	0.882	0.791
Non-parametric	(a)	CRS (i) pooled	0.764	0.780	0.748
	(a)	CRS (ii) within year	0.873	0.899	0.865
	(b)	VRS (i) pooled	0.833	0.881	0.820
	(b)	VRS (ii) within year	0.943	0.954	0.929

Summary of results 1: Johnes 2014

- The typical HEI involved in a merger has efficiency which is similar to the average non-merging HEI
- The typical merged HEI is significantly more efficient than either pre-merger or non-merging HEIs

Caveats

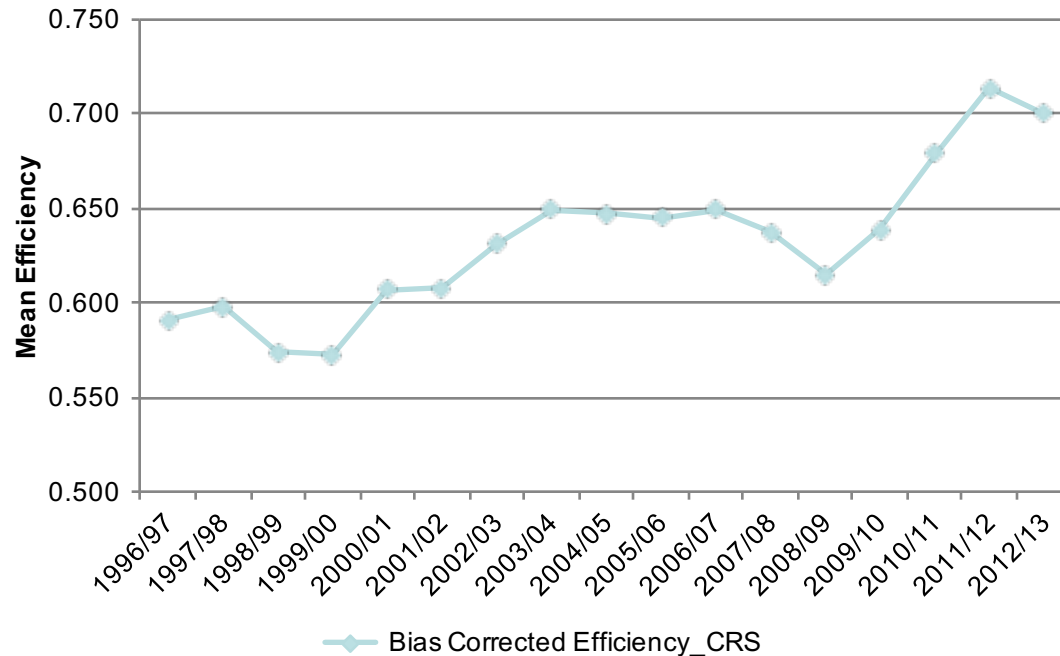
- The two-way relationship between merger and efficiency is not explored
- The characteristics of pre-, post- and non-merging HEIs differ; any efficiency differences may be a consequence of something other than the merger
- Effects of merger can vary by the types of HEI participating in the merger; there are both winners and losers in the merging process

Summary of results 2: Johnes and Papadimitriou 2016

- Panel of data from 1996/97 to 2012/13 with $n = 2197$ total observations (the number of HEIs varies from 125 to 138 in each year)
- Data from Higher Education Statistical Agency (HESA)
- All money units in 2012 values
- 28 mergers in the data set
- DEA used to measure efficiency
- Merger effects explored using a second stage model regressing efficiency on a variety of possible explanatory variables including whether or not a HEI merged

Summary of results 2: Johnes and Papadimitriou 2016

- Mean DEA efficiency over time



Summary of results 2: Johnes and Papadimitriou 2016

	Model 1	Model 2	Model 3
Pre-Merger	0.015 (0.010)	0.015 (0.010)	
Post-Merger	0.046*** (0.011)		
Merger_t-3			-0.011 (0.025)
Merger_t-2			0.034 (0.023)
Merger_t-1			-0.002 (0.021)
Merger_t		0.023 (0.028)	0.019 (0.028)
Merger_t+1		0.071** (0.029)	0.065** (0.030)
Merger_t+2		0.051* (0.029)	0.047 (0.029)
Merger_t+3		0.041 (0.031)	0.037 (0.031)
Merger_t+4		0.036 (0.029)	

Summary of results 2: Johnes and Papadimitriou 2016

- Efficiency of merged HEIs is significantly higher than that of non-merged (taking into account a whole array of other characteristics of the HEIs)
- The efficiency effects seem to occur 1 and 2 years after the merger but are not observed afterwards

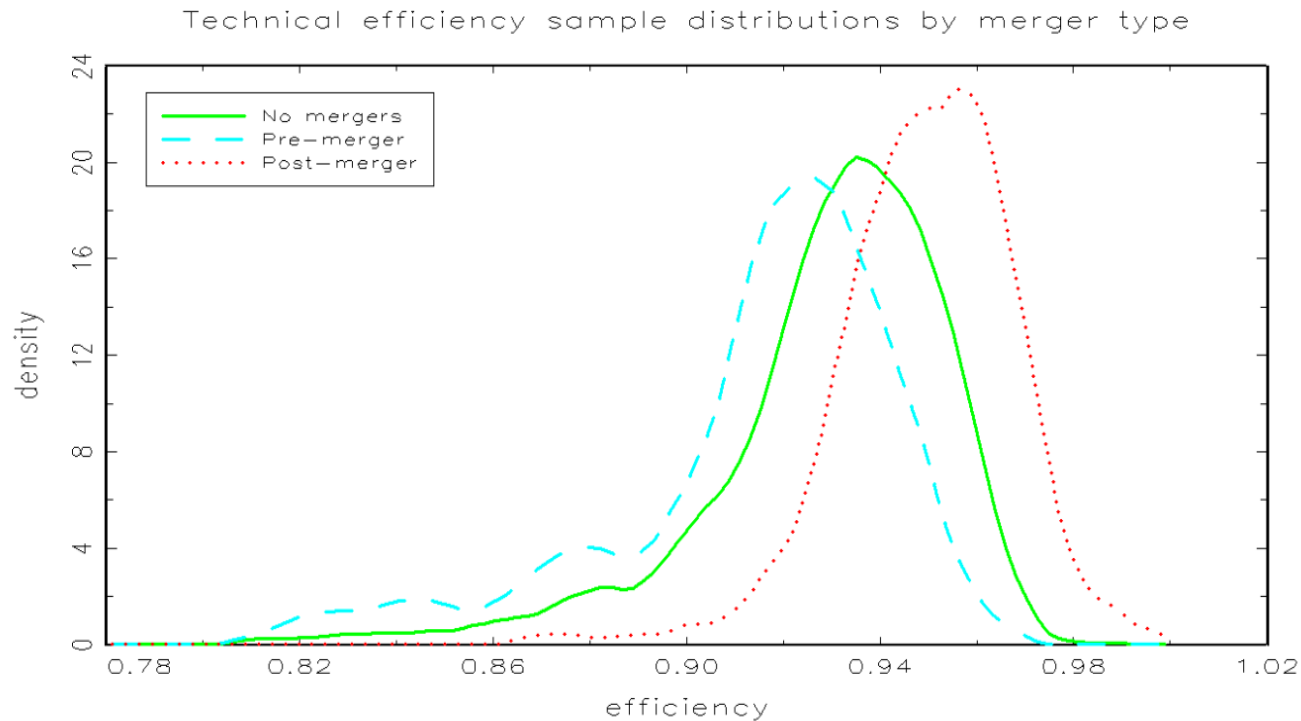
Caveats

- The two-way relationship between merger and efficiency is not explored
-

Summary of results 3: Johnes and Tsionas 2016

- Panel of data from 1996/97 to 2008/09 with $n = 1694$ (the number of HEIs varies from 126 to 138 in each year)
- All money units in 2008 values
- Data from Higher Education Statistical Agency (HESA)
- 25 mergers
- Uses SFA to estimate efficiency
- Uses a complex model which takes into account the endogeneity (two-way relationship) between merger activity and efficiency

Summary of results 3: Johnes and Tsionas 2016



Summary of results 3: Johnes and Tsionas 2016

But the overlapping of the distributions suggests that efficiency improvement is not unambiguous. In fact

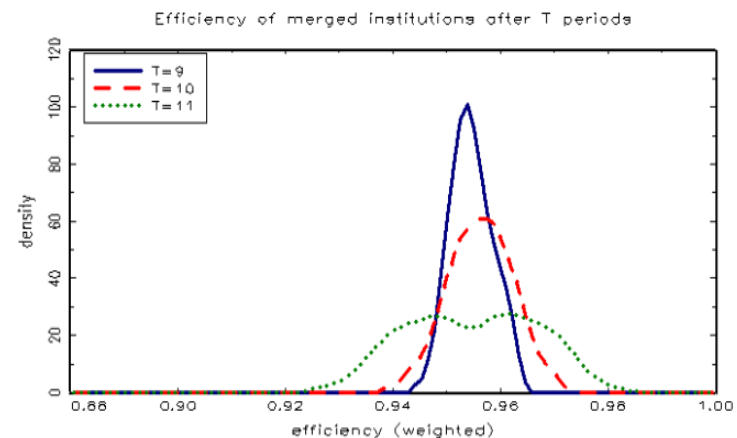
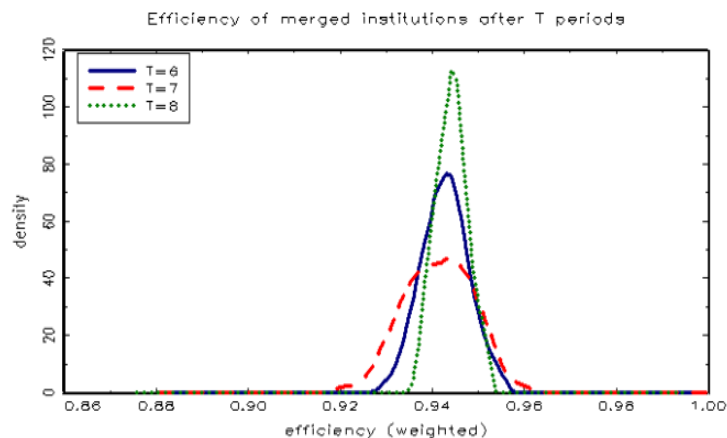
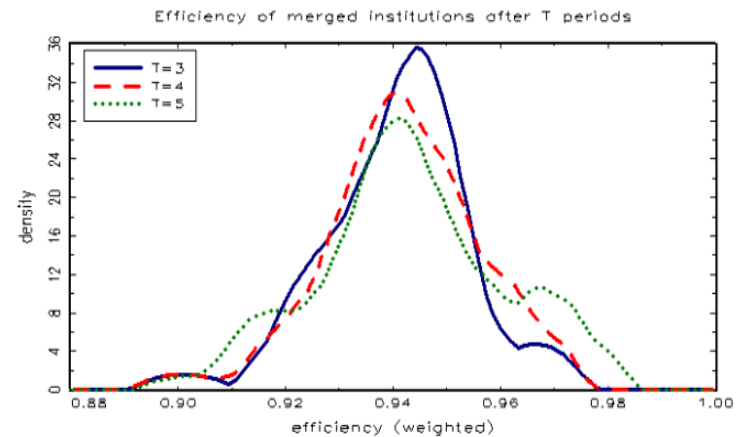
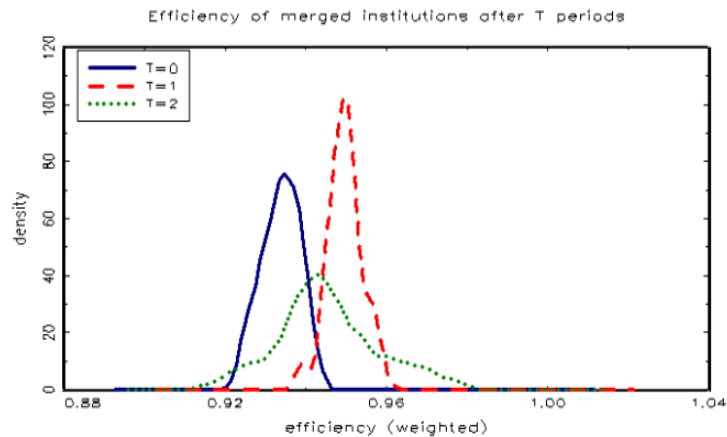
- Of 25 mergers, 11 have a less than 70% probability that efficiency will improve

Summary of results 3: Johnes and Tsionas 2016

What are the characteristics of a “successful” merger?

- Geography (Skodvin 1999)?
- An examination of the distance between merging HEIs reveals no particular patterns
- Similar culture and mission (HEFCE 2010)?
- Possibly not: Of the 11 mergers which have probability of efficiency improvement < 70%, 6 are between HEIs of the same type
- Grants from HEFCE's Strategic Development Fund (now called the Catalyst Fund)?
- For example: the Manchester merger attracted a grant of £10 million **plus** a further £10 million in repayable grants

Summary of results 3: Johnes and Tsionas 2016



Conclusions

- Merging HEIs are typically more efficient than pre- and non-merging HEIs (Johnes, 2014; Johnes & Tsionas, 2016; Johnes & Papadimitriou, 2016)
- Efficiency improvement is not experienced across all mergers (Johnes, 2014; Johnes & Tsionas, 2016)
- The benefits of merger are probably experienced sooner rather than later (Johnes & Papadimitriou, 2016; Johnes & Tsionas 2016)
- The reasons for differences between mergers and over time should be explored further

Conclusions

Caveats – our efficiency model doesn't measure:

- loss imposed by the merger in terms of learning (and teaching) experience on the part of students (or staff)
- possible social costs arising from reduction in diversity between HEIs in the sector caused by merging
- regional economic effects of HEI closures