

Productivity Dynamics in the Great Stagnation: Evidence from British Businesses

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Acknowledgements:

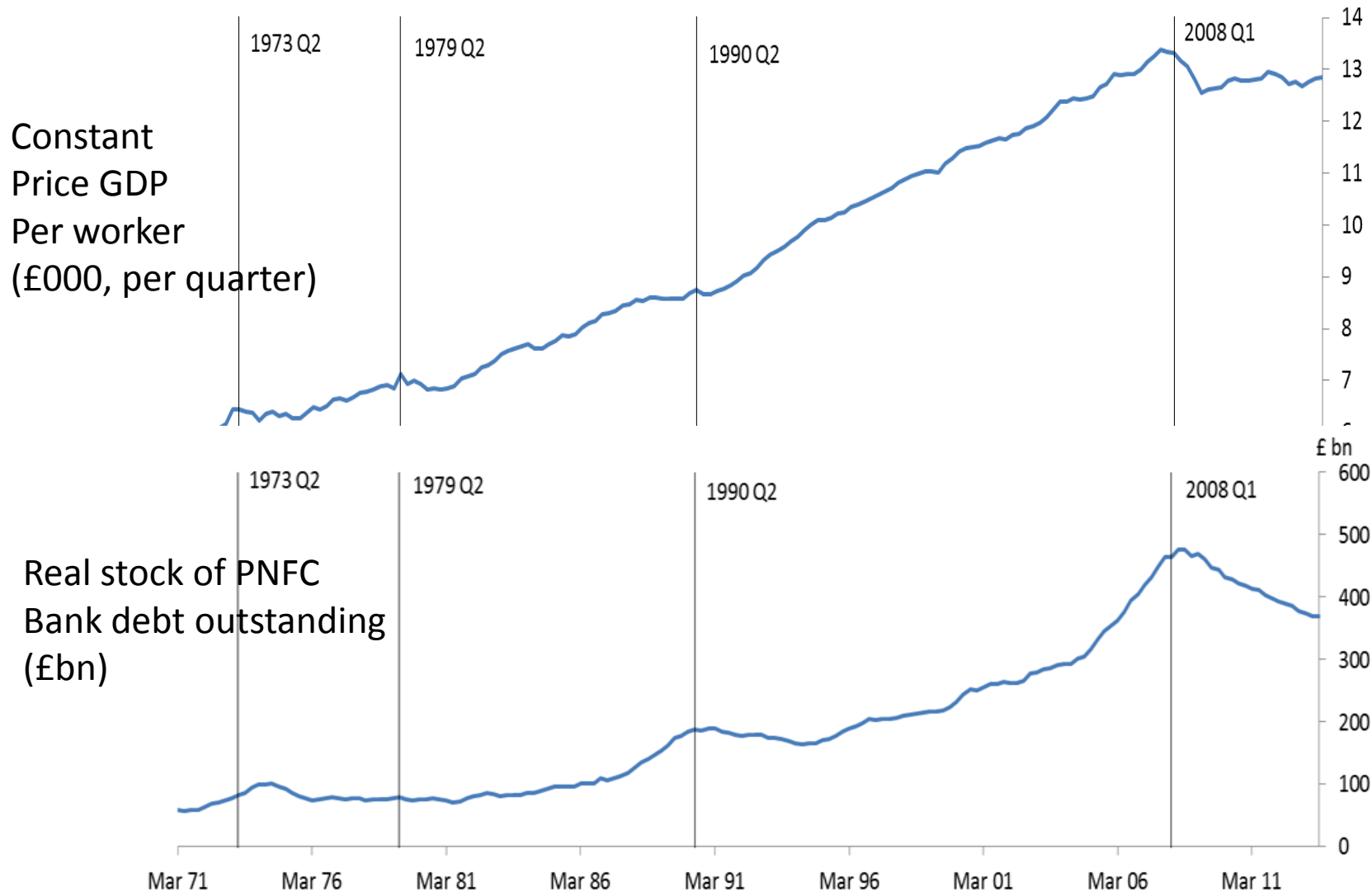
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Stylised Facts

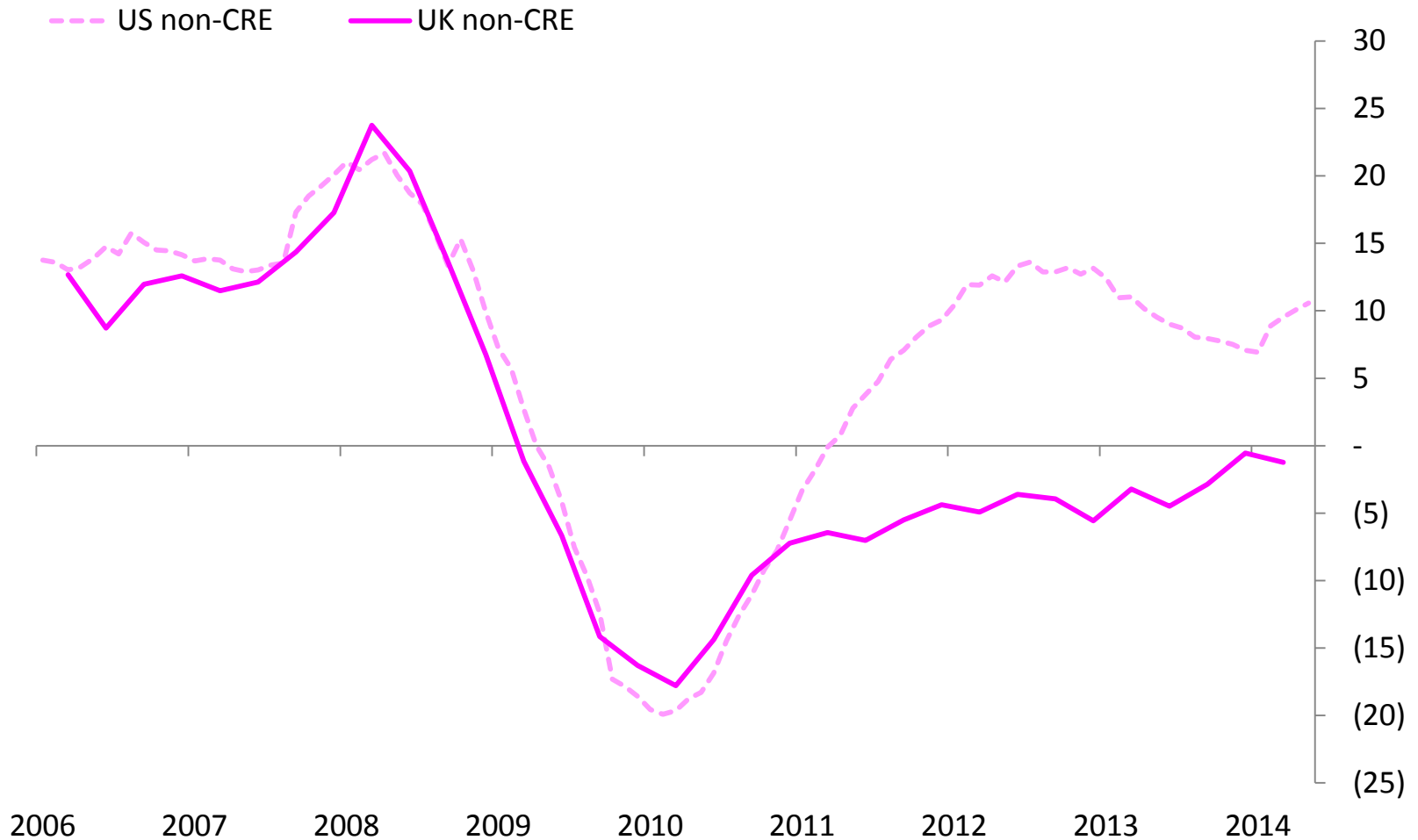
- UK labour productivity fell sharply during the recession of 2008-9 and recovered only sluggishly after that
 - In level terms productivity is currently around 15% below a simple extrapolation of its pre-crisis trend
- In sharp contrast with the experience of other post-war recessions in the UK when the fall was less steep and the recovery was quicker
- By 2012 the stock of real bank debt held by UK corporations was more than 20% below its peak before the crisis, much of which reflected a tightening of credit supply

Productivity and bank lending following recessions



Differences in lending to PNFCs UK-US

Percentage changes on a year earlier



Motivation

- “*Cleansing effects*” of recession: recession often considered a time when the economy is rid of its less productive units, making space for more productive firms to expand
- **However**, these effects may be depressed when capital markets are imperfect and firms face credit constraints as in a recession accompanied by a banking crisis and credit crunch.

Distortions to the reallocation of resources across businesses may reduce aggregate productivity:

- ➔ by preventing high productivity but bank dependent firms from expanding or causing them to exit
- ➔ by deterring start-ups that require an initial capital outlay
- ➔ by protecting more established, yet weak companies (directly via bank forbearance; indirectly via reduced competitive pressures)

What can we learn about the banking crisis and productivity by looking at firm level data?

A banking crisis may inhibit efficient resource allocation across businesses

- Using firm level data we can examine whether aggregate productivity weakness arises because of resource misallocation between existing firms and/or a lack of creative destruction or cleansing effect of recession

Using firm-level data to break down productivity growth into different components

$$\begin{aligned} & \text{Overall productivity growth} \\ & = \\ & \text{Average productivity growth *within* surviving businesses} \\ & + \\ & \text{Reallocation towards more productive surviving businesses (*between*)} \\ & + \\ & \text{Reallocation towards new businesses (*entry*)} \\ & + \\ & \text{Reallocation from exiting businesses (*exit*)} \end{aligned}$$

Productivity dynamics: Related literature

Other studies analyse the pattern of productivity dynamics in the wake of a financial crisis:

- Japan during the 1990s
 - Griffin and Odaki (2009)
- US manufacturing firms during the Great Recession
 - Foster, Grim and Haltiwanger (2013)
- UK firms during the Great Recession
 - Barnett, Chiu, Franklin and Sebastia-Barriel (2014)

More formally: decomposition of aggregate productivity growth

We start by writing aggregate productivity at time t (Π_t) as a share-weighted average of the productivity of individual firms (π_{it}):

$$\Pi_t = \sum_i s_{it} \pi_{it}$$

where s_{it} is a measure of firm i 's market share at time t , $s_{it} \geq 0$ and $\sum_i s_{it} = 1$

We then decompose the change in share weighted firm productivity between time $t-k$ and time t into 4 components:

$$\begin{aligned} \Delta \Pi_t &= \sum_{i \in C} \bar{s}_{Ci} \Delta \pi_{it} && \textit{Within} \\ &+ \sum_{i \in C} \Delta s_{Cit} (\bar{\pi}_i - \bar{\Pi}_C) && \textit{Between} \\ &+ \sum_{i \in N} s_{it} (\pi_{it} - \Pi_{Ct}) && \textit{Entry} \\ &- \sum_{i \in X} s_{i,t-k} (\pi_{i,t-k} - \Pi_{C,t-k}) && \textit{Exit} \end{aligned}$$

Similarities with other decompositions

Hybrid between decompositions that are widely used in the literature (also suggested in Diewert & Fox, 2010):

1. We follow Melitz & Polanec (2012) when we look at the contribution of entry and exit:

Foster, Haltiwanger & Krizan (2001) and Griliches & Regev (1995) benchmark the productivity of entrants against average productivity measured at an earlier point in time.

In an economy where productivity is generally falling, these decompositions tend to bias downward the contribution of entering firms.

To avoid to bias our results we benchmark the productivity of entering (and exiting) firms on the productivity of continuing firms at the time of entry (or exit).

2. We follow Griliches and Regev (1995) when we look at the contribution of continuing firms:

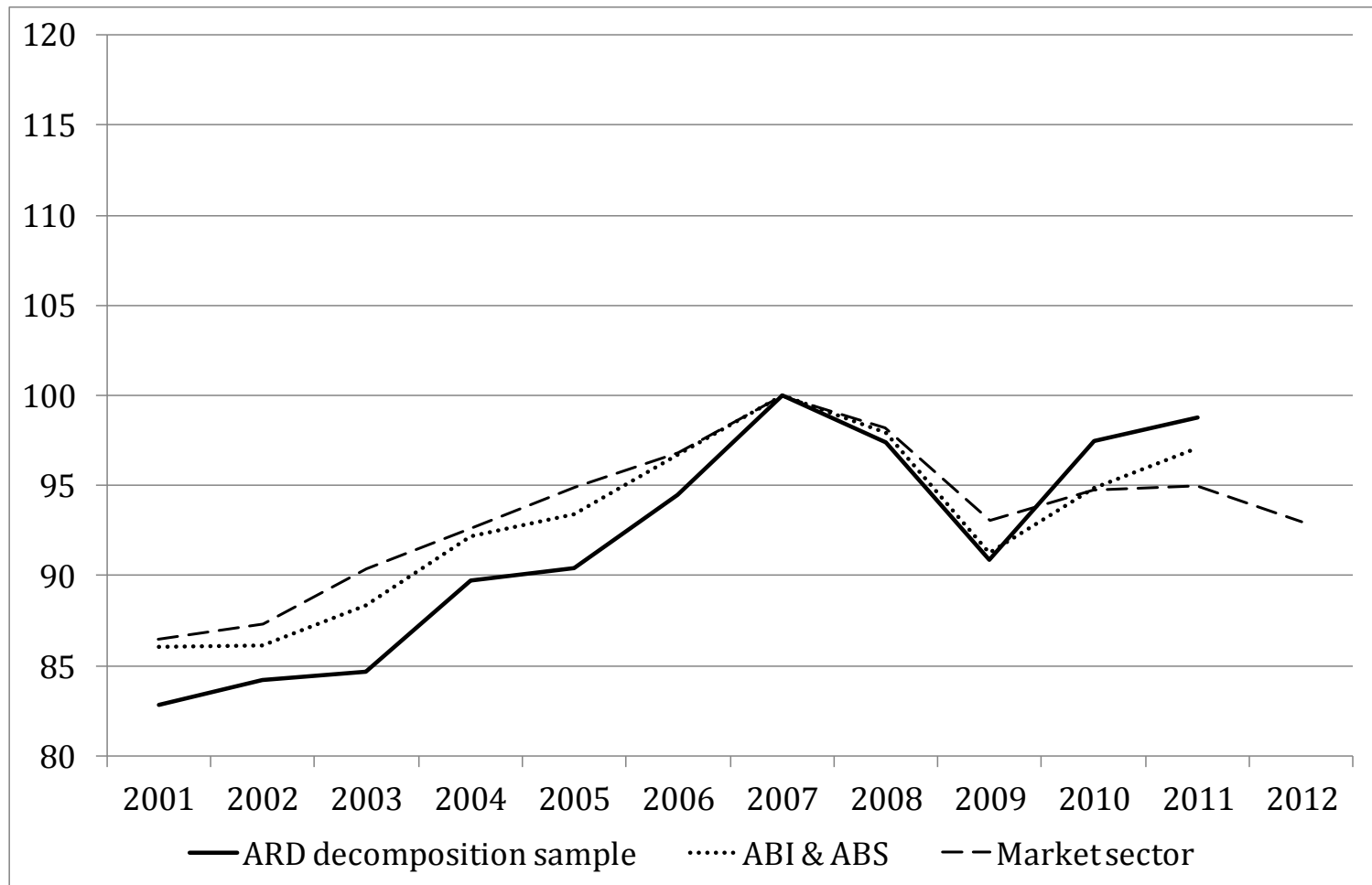
Melitz & Polanec (2012) decomposition results in a disjuncture between the measurement of the contribution of external restructuring between existing firms and that due to entry and exit.

Their measure of the within component uses an un-weighted rather than shared weighted mean. This increases the influence of small firms (attaching equal weights to small and large firms) making the estimates of the within and between component more volatile across time periods and data samples.

Data: the Annual Respondents Database (ARD)

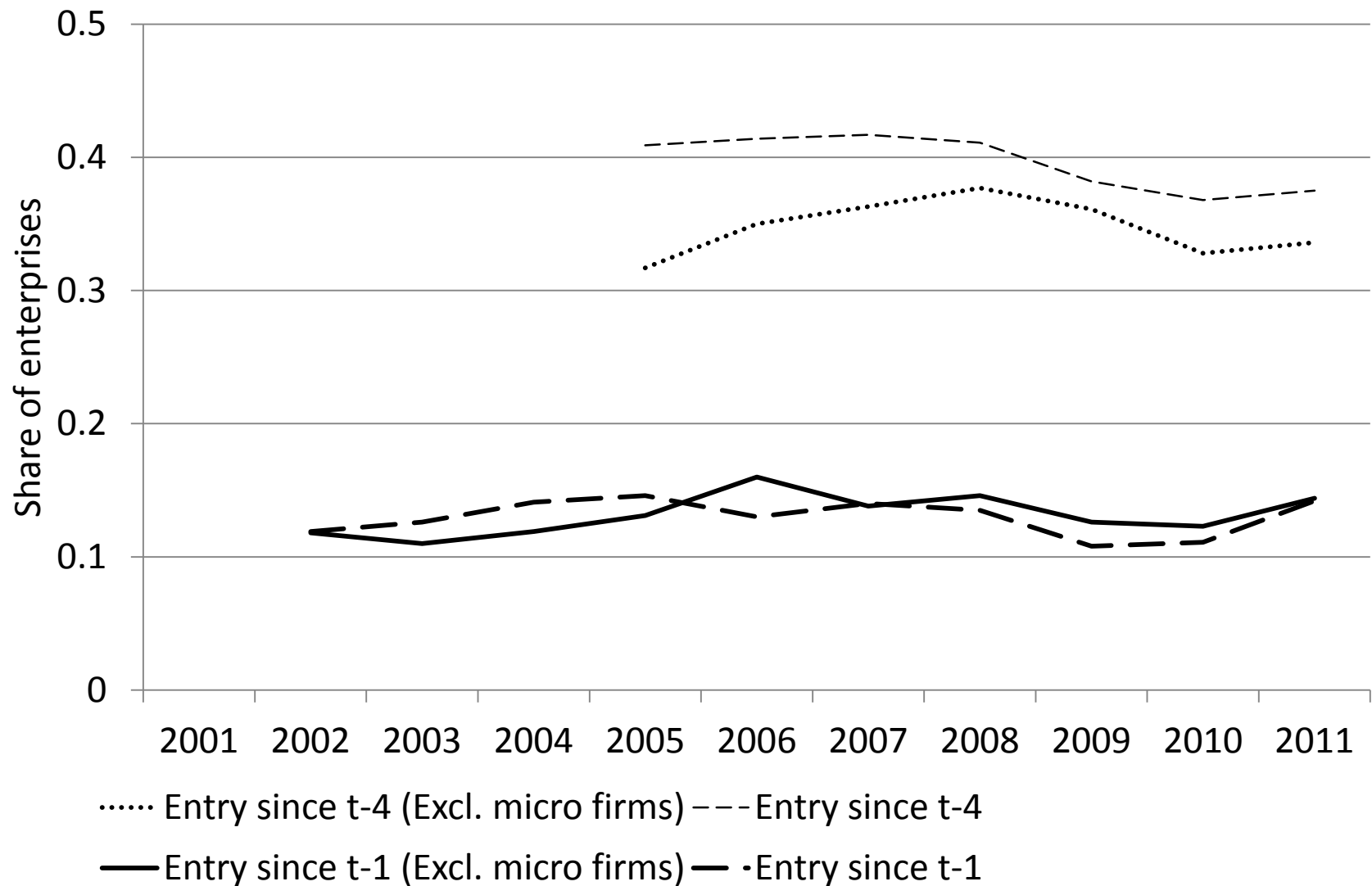
- Establishment level survey which covers businesses in the non-financial non-farm market sectors
- Data available for 1997-2011 (now 2012) and for manufacturing back to 1974
- A census of larger businesses and a stratified random sample of businesses with less than 250 employees
- It contains also basic information for all businesses in the sampling frame (the IDBR, a list of all UK businesses registered for tax purposes) which allows to:
 - Determine business entry and exit
 - Calculate grossing weights
- We focus on the longitudinal sample of firms with 10 or more employees since it is insufficient to support representative analysis of micro firms:
 - The probability of observing a micro business in two separate years (conditional on being live) is only 1 in 10,000
 - Redefine entry and exit
- We aggregate the data up to the enterprise level, as banking relationships are more likely to take place at this level of aggregation
- Financial information is published in current values
 - GVA deflators available at 2- and 3-digit sector level are used to construct real values

TRENDS IN LABOUR PRODUCTIVITY, 2001-2012

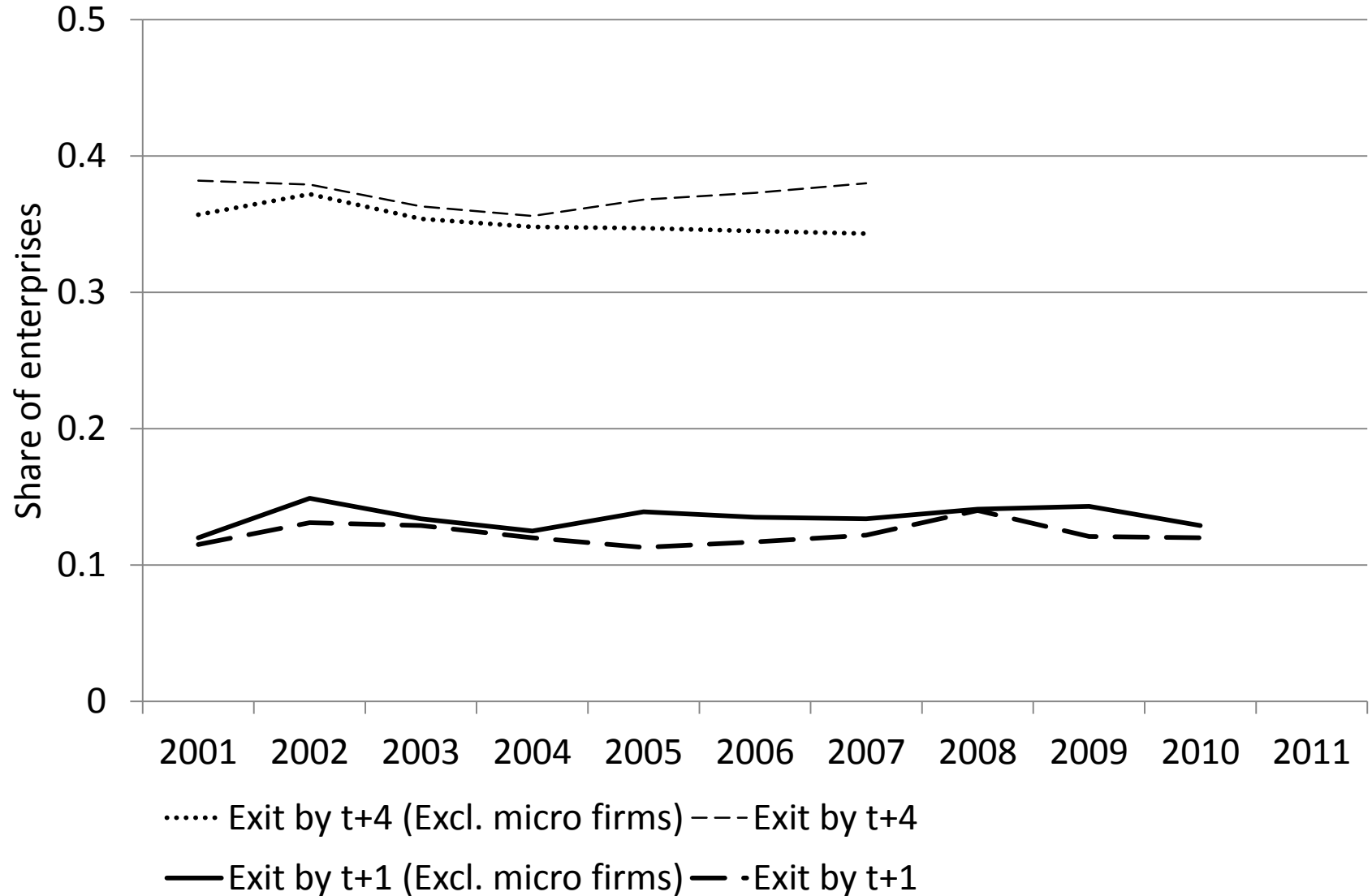


- Differences between the series expected because of differences in sector and size coverage and in cleaning and weighting procedures
- All these series exhibit broadly the same pattern over time, with labour productivity in 2011 a little more than 10% below a simple linear extrapolation of the trend 2001-2007

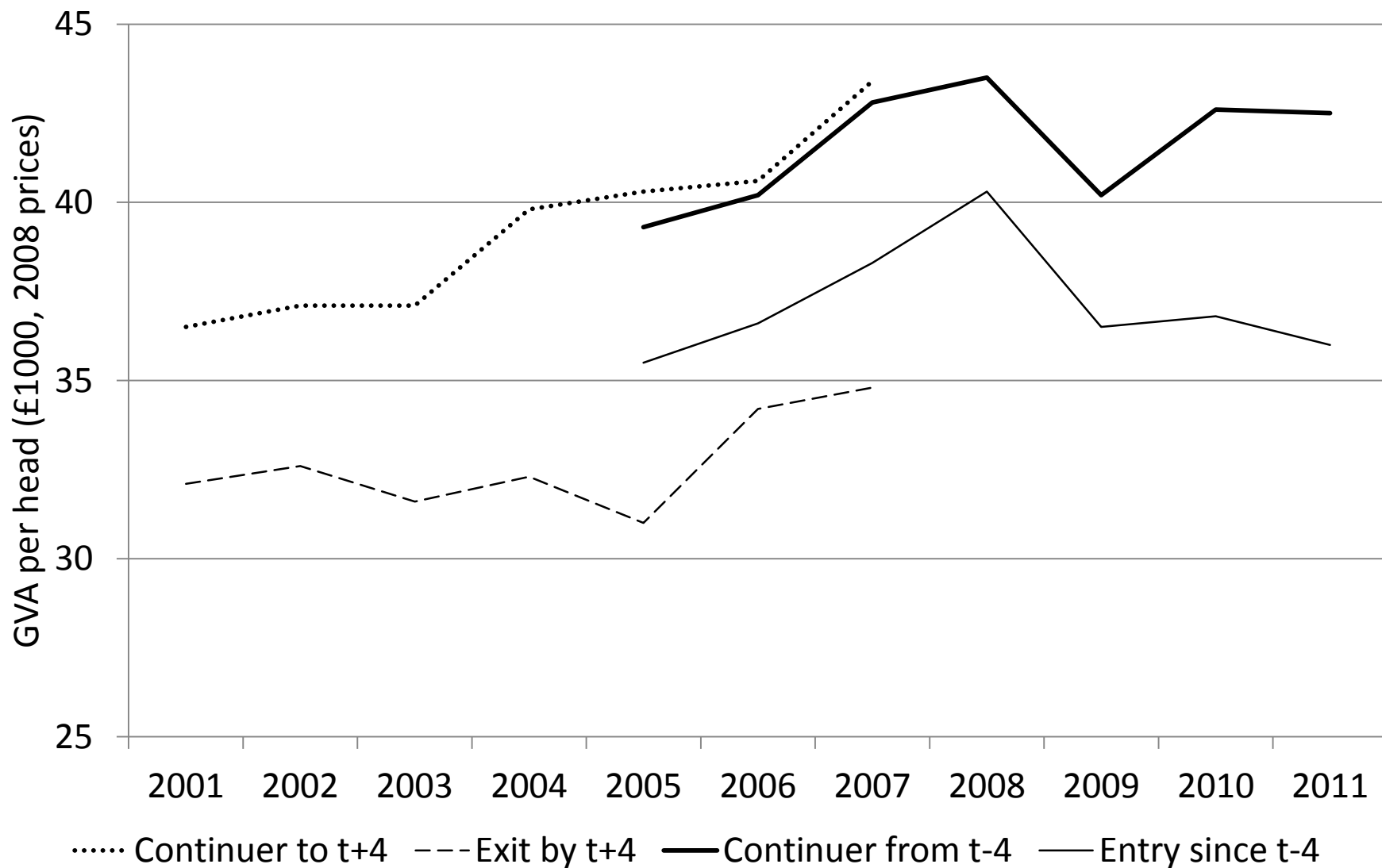
ENTRY RATES, 2001-2011



EXIT RATES, 2001-2011



LABOUR PRODUCTIVITY BY CONTINUER, ENTRY AND EXIT STATUS



Decomposition of 4-year changes in labour productivity

	Growth components				External		
	Within	Between	Entry	Exit	Net entry	Total	Total
<i>Productivity growth(%)</i>							
2007-2011	-10.1	6.5	-2.1	4.5	2.4	8.9	-1.2
2003-2007	8.9	4.8	-1.6	3.7	2.1	6.9	15.8
2001-2005	5.5	0.2	-1.0	2.7	1.8	2.0	7.5
<i>Productivity growth change (% points)</i>							
2003-2007 to 2007-2011	-19.0	1.7	-0.5	0.8	0.3	2.0	-17.0
2001-2005 to 2007-2011	-15.7	6.3	-1.1	1.8	0.7	7.0	-8.7

Source: Annual Respondents Database, ONS, and authors' calculations.

Notes: Growth components Within, Between, Entry and Exit sum to Growth Total. Entry and Exit sum to Net entry. Between, Entry and Exit sum to External Total. Non-farm non-financial market sectors excluding mining & quarrying, utilities and real estate activities. Britain. Firms are classified as live if they are active and have 10 or more persons employed.

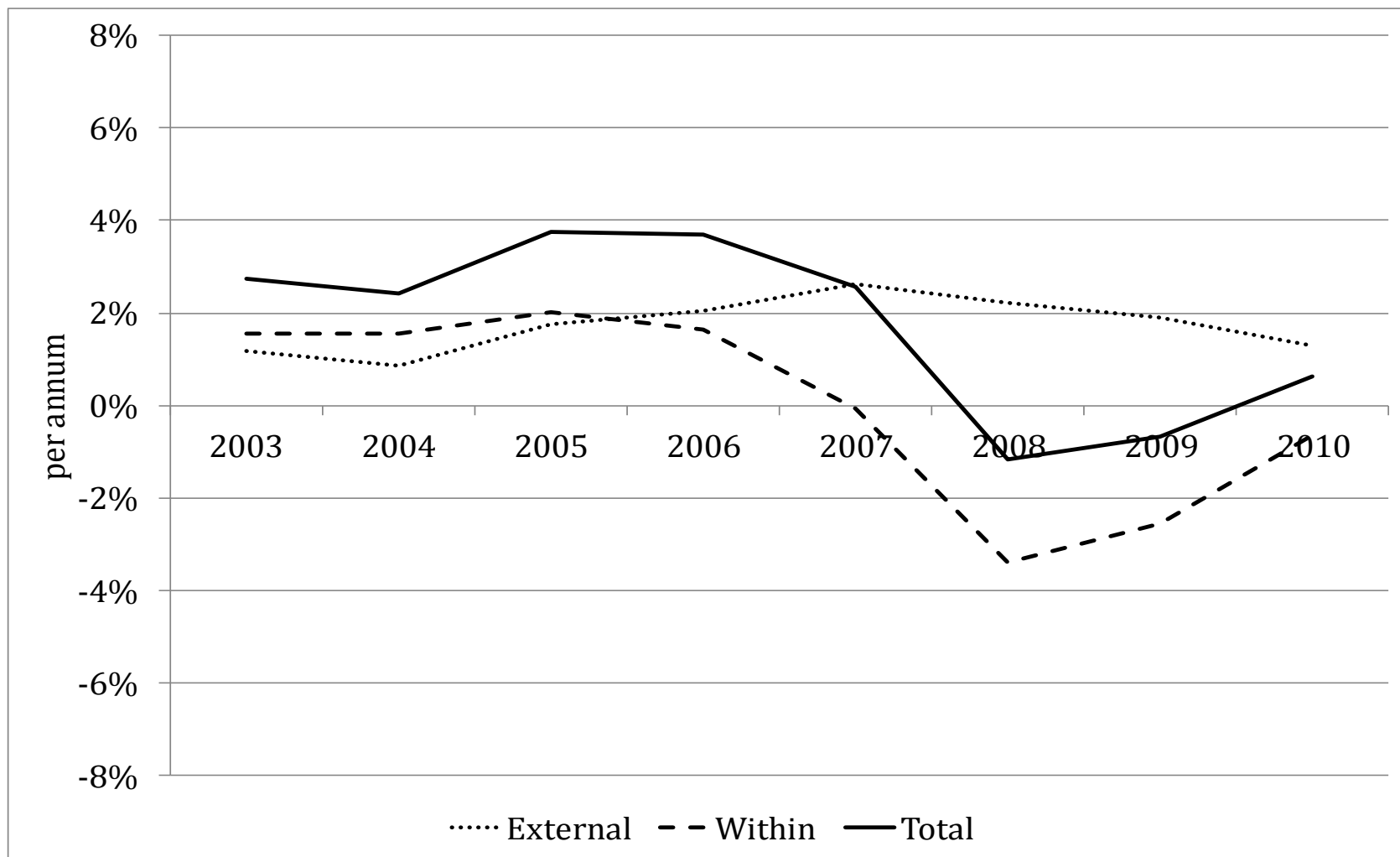
Decomposition of 4-year changes in labour productivity (continued)

Sub-group	<i>Productivity growth change (% points)</i>	Growth components				External		
		Within	Between	Entry	Exit	Net entry	Total	Total
Manufacturing								
	2003-2007 to 2007-2011	-26.0	0.8	1.0	-0.5	0.5	1.3	-24.7
	2001-2005 to 2007-2011	-21.0	1.6	0.8	-0.1	0.7	2.3	-18.7
Services								
	2003-2007 to 2007-2011	-17.2	1.5	-0.8	1.0	0.2	1.7	-15.5
	2001-2005 to 2007-2011	-15.6	7.8	-1.7	2.3	0.6	8.4	-7.2
SMEs								
	2003-2007 to 2007-2011	-21.6	2.6	-0.8	1.7	1.0	3.6	-18.0
	2001-2005 to 2007-2011	-16.9	7.8	-2.6	5.4	2.8	10.6	-6.3
Large								
	2003-2007 to 2007-2011	-16.3	-0.9	-0.5	0.7	0.2	-0.7	-17.0
	2001-2005 to 2007-2011	-13.4	1.4	-1.3	0.6	-0.7	0.8	-12.6

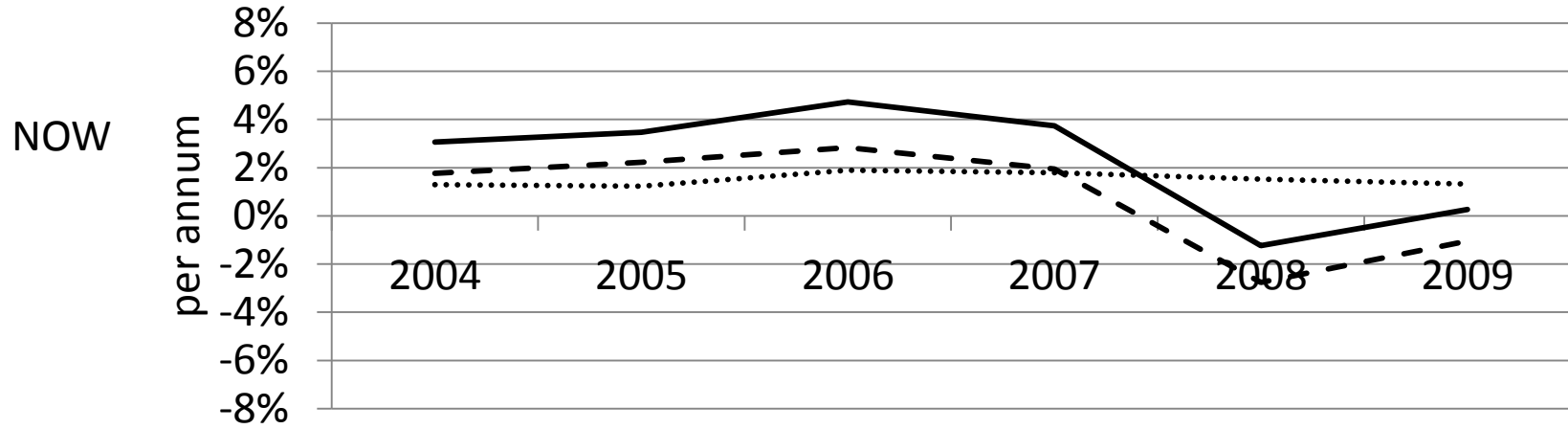
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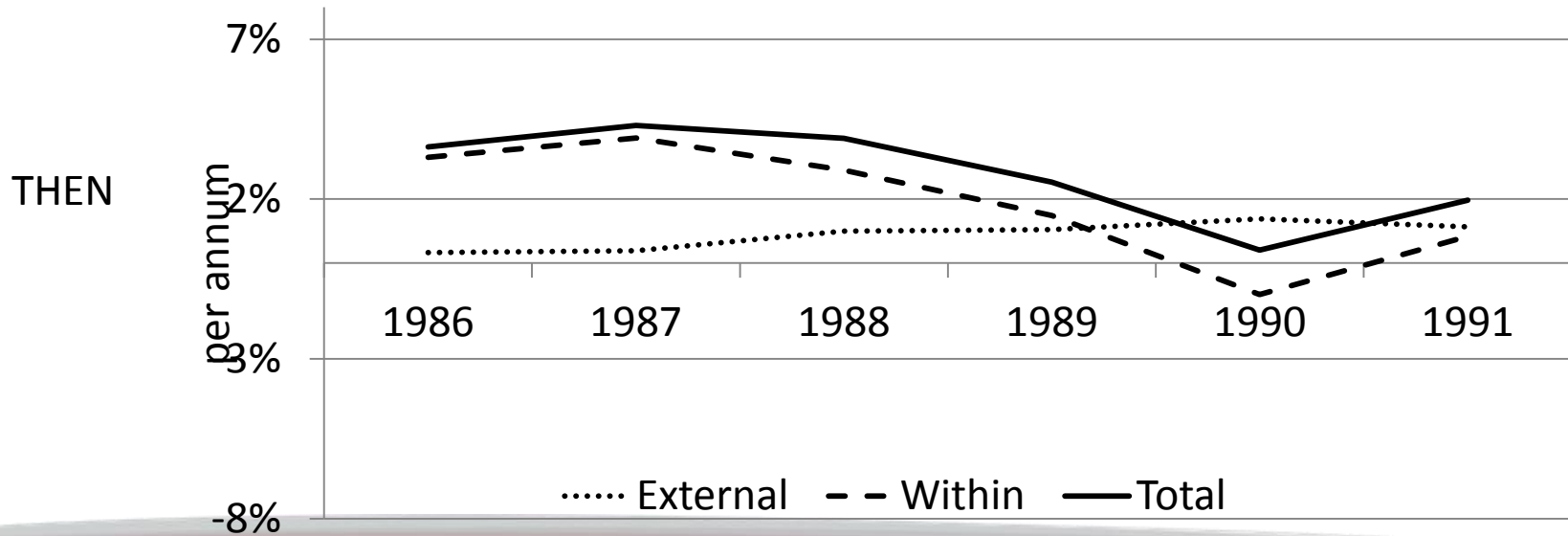
Decomposition of 1-year changes in labour productivity



Manufacturing recessions compared



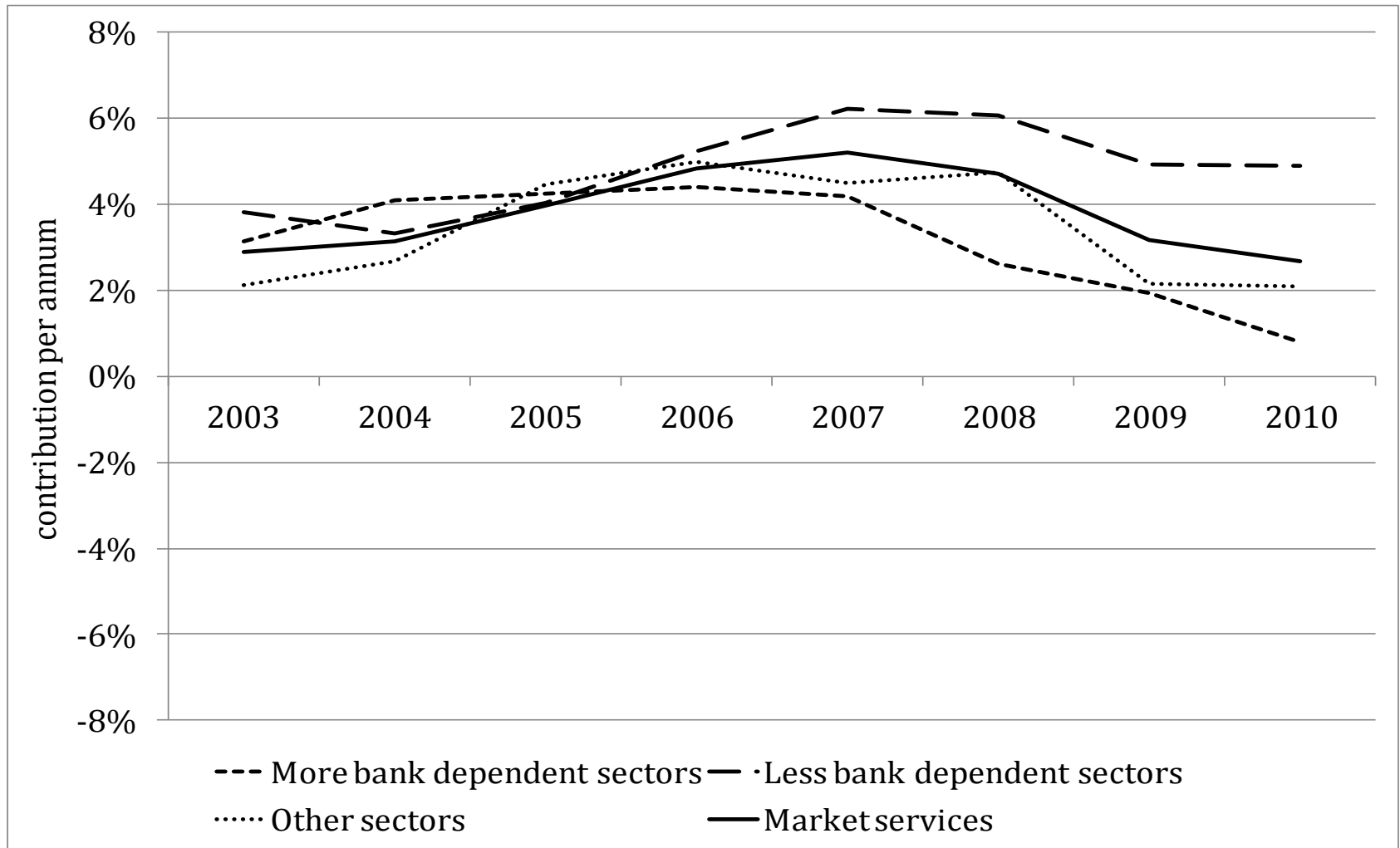
..... External - - Within — Total



..... External - - Within — Total



External restructuring and productivity growth, service sector SMEs, 2002-2011



Productivity dynamics: Conclusions

- The reduction in UK labour productivity between 2007 and 2011 was first and foremost the result of a broad-based decline in productivity within businesses
 - Not a reduction in the contribution of business reallocation to aggregate productivity growth.
 - The question of what has caused this productivity drop within firms remains (and banking sector collapse may be one reason).
- The recession does appear to have had some "cleansing effect" or been associated with creative destruction.
 - Albeit not sufficient to offset fully the large drop in productivity within firms.
- We do observe patterns that suggest an empirical link between banking sector collapse and aggregate productivity via less efficient resource allocation
 - Downward trend in the contribution of external restructuring due to SMEs in the more bank dependent sectors.
 - Reduction in the productivity contribution of entering firms.
 - Comparison of manufacturing firms in two different recessions suggests we might have expected a slightly higher productivity contribution from external restructuring (although key differences are due to the within component)
- Data limitations
 - Exclusion of micro firms.
- What is the counterfactual?
 - We cannot say with certainty what the productivity contribution of external restructuring would have been in the absence of a banking sector crisis.