



Department
for Environment
Food & Rural Affairs

Total Factor Productivity by farm type: Using the Farm Business Survey

Presented by: Jo Hutchinson

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- Background to Total Factor Productivity (TFP)
 - Approach to using the Farm Business Survey (FBS) to calculate TFP
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- <https://www.gov.uk/government/statistics/total-factor-productivity-for-england-by-farm-type>

What is Total Factor Productivity (TFP)?

- Key measure of the overall economic performance of agriculture and an important driver of farm incomes.
- Represents how efficiently farms use the resources that are available to turn inputs into outputs.
 - Based only on volumes.
- Results are measured as the change in volume of output divided by the volume of inputs.
- TFP excludes:
 - Subsidies
 - Gross fixed capital formation and consumption of fixed capital for livestock

Partial factor productivity

- Breaks down total factor productivity to the productivity by each input.
- Partial factor productivity measures how efficiently intermediate consumption, capital, labour and land are transformed into outputs,

$$\text{Partial Factor Productivity} = \frac{\text{volume of total outputs}}{\text{volume of input component}}$$

- Takes into account development in other inputs

How do we currently measure TFP?

- Calculated at an aggregate level using data from the UK Aggregate Accounts
- Data gathered from a number of sources
 - Farm Business Survey (inputs)
 - June Survey/Farm Structure Survey (labour)
 - Crop data from various sources: Defra Surveys, Agriculture and Horticulture Development Board (AHDB), and contractors (ADAS)
 - Livestock data from various sources: Defra Surveys supplemented with data from the AHDB and livestock tracing systems
- Produced annually at the UK level

Sector Level TFP – why are we interested?

- Get below the aggregate TFP series
 - to compare trends and drivers of productivity across sectors
 - to see how productivity varies over time within a sector
- Variations in performance at sector level missed at the aggregate level, not showing how sectors have different productivity challenges
- Therefore, to be able to provide more informative analysis that can help policy formation, it is useful to be able to examine productivity at the sector rather than aggregate level.

Using the Farm Business Survey (FBS)

- Defra's detailed survey of farm accounts. Can classify farms by a variety of factors including:
 - Sector
 - Region
 - Tenure
- Detailed data on the value and volume of farm outputs.
- Detailed data on the value of inputs. Limited data on input volumes. Where not available directly volumes generated using price indices.
- Used the same underlying methodology as for the UK TFP series

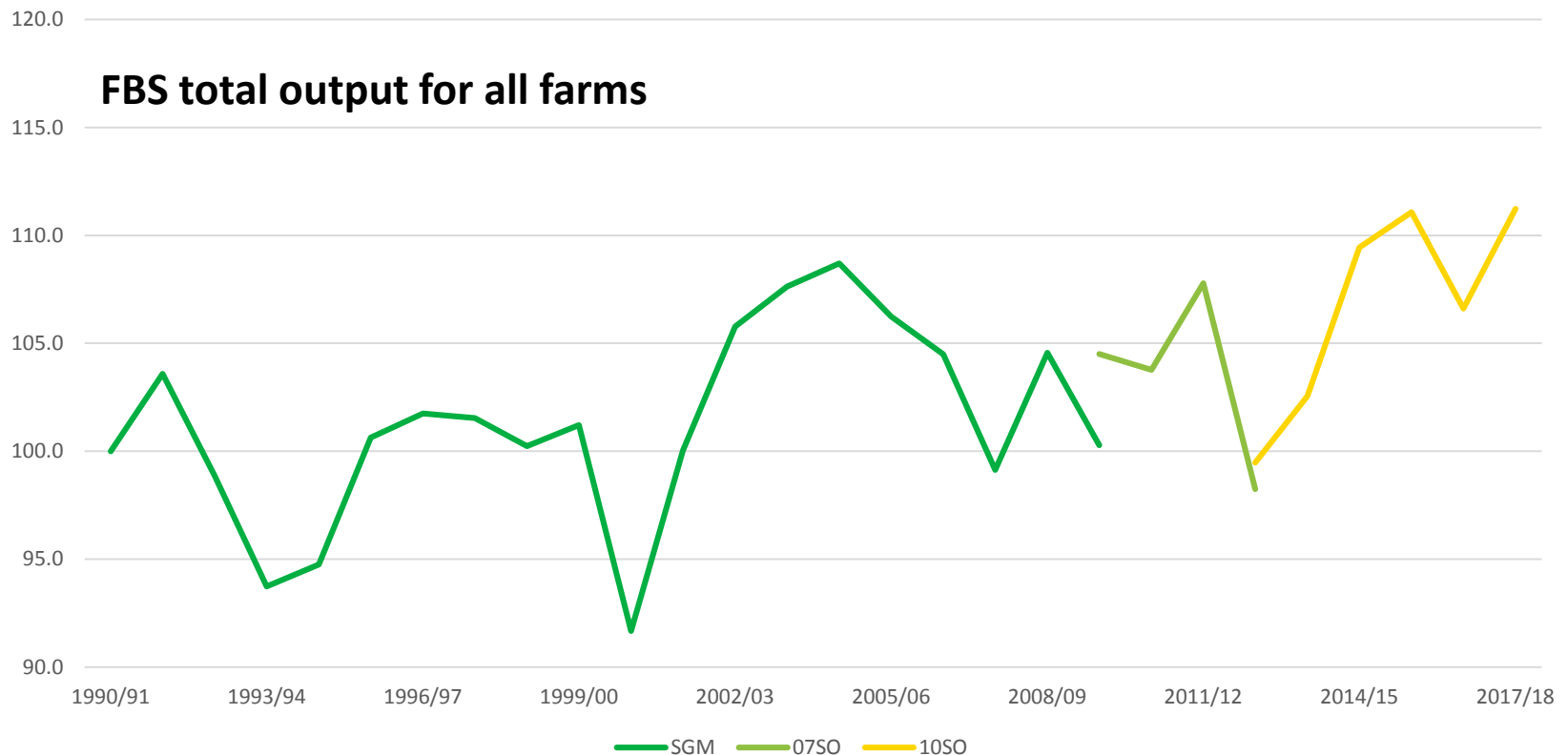
Issues dealt with when using the FBS data

- Mapping - 500 individual items are needed
 - Corresponding FBS survey items had to be identified
 - Volume and value needed for each item - FBS does not collect volumes for some of the items
e.g. we know how much farmer spends on crop protection but not how much they actually use. So we have used price indices to derive a volume from the value.

- Negative values

Issues dealt with when using the FBS data

- Break in the series
 - Changes in FBS recording form over time
 - Changes in entry criteria (thresholds) for the FBS
 - Changes to farm typology



Remaining issues

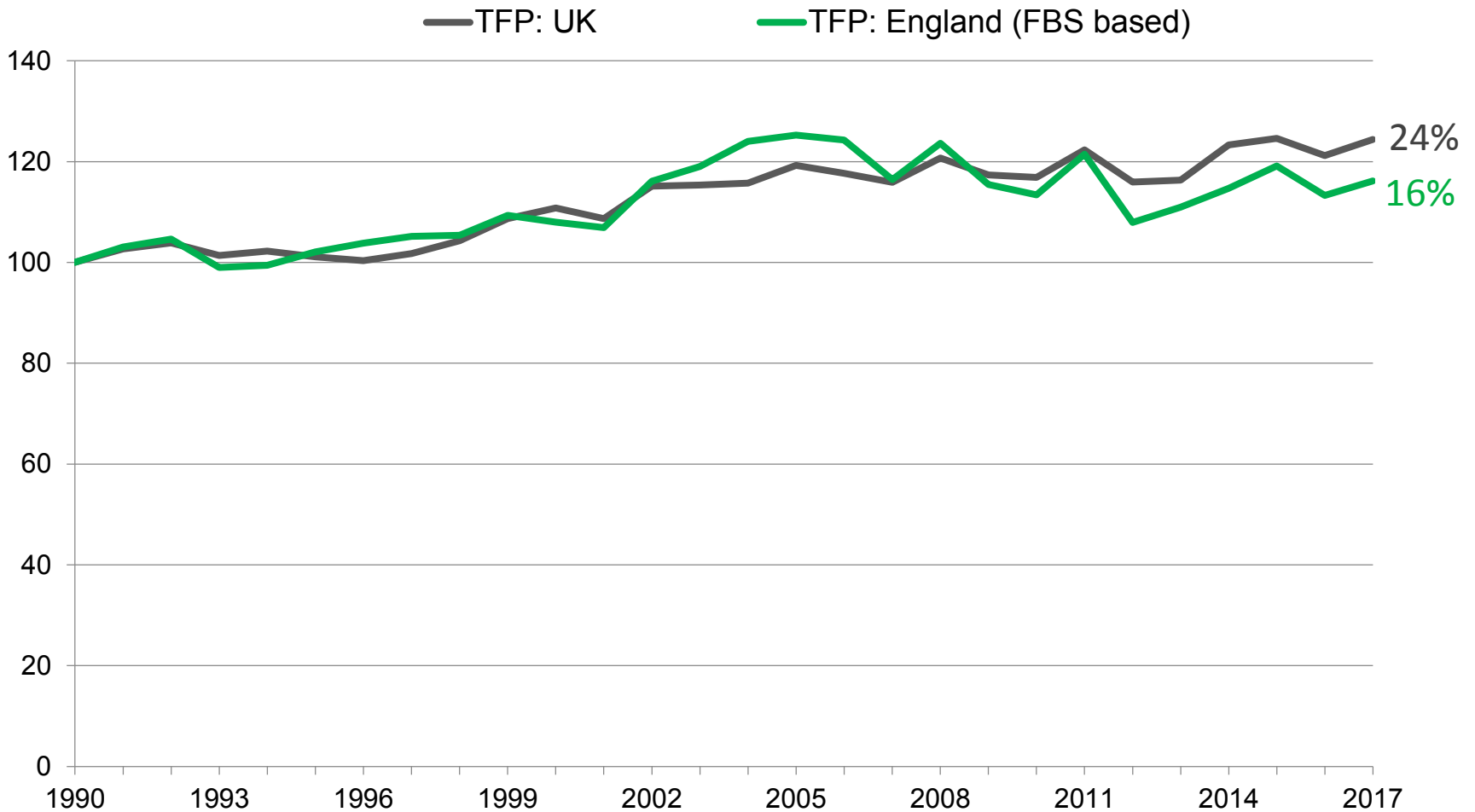
- Small samples
- Sample turnover and composition
- England level only – although looking to work with DAs

Experimental Statistics

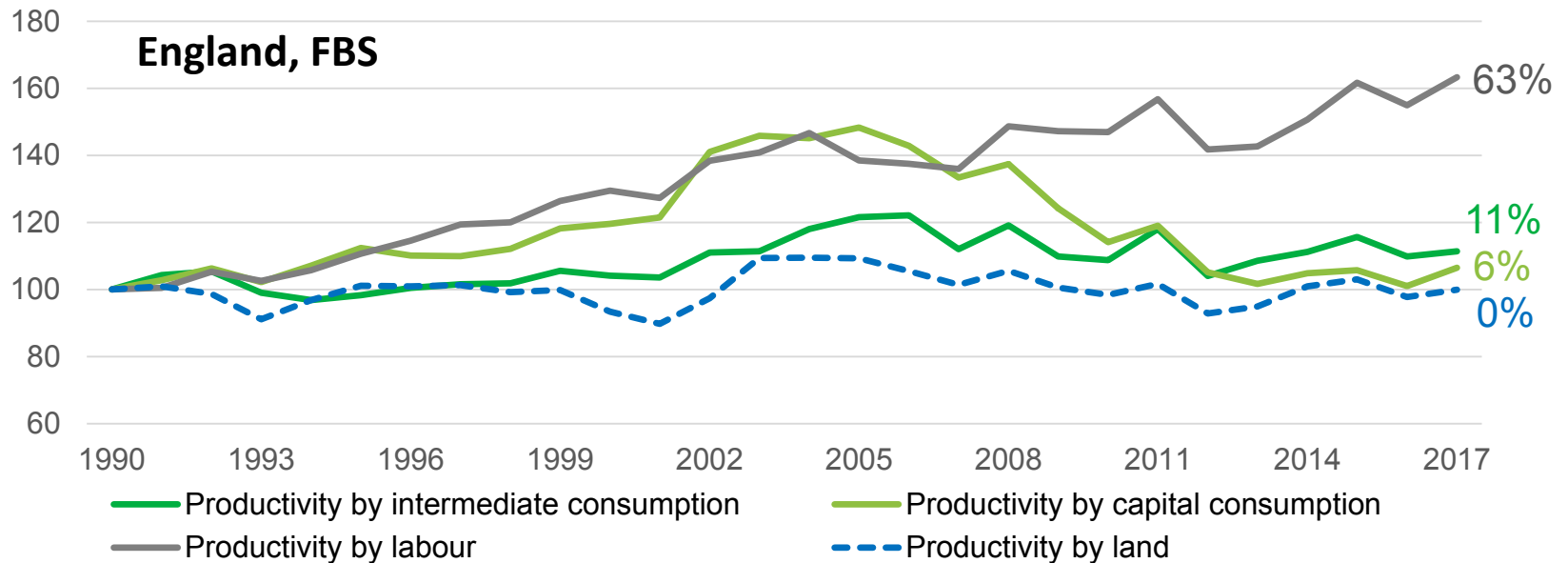
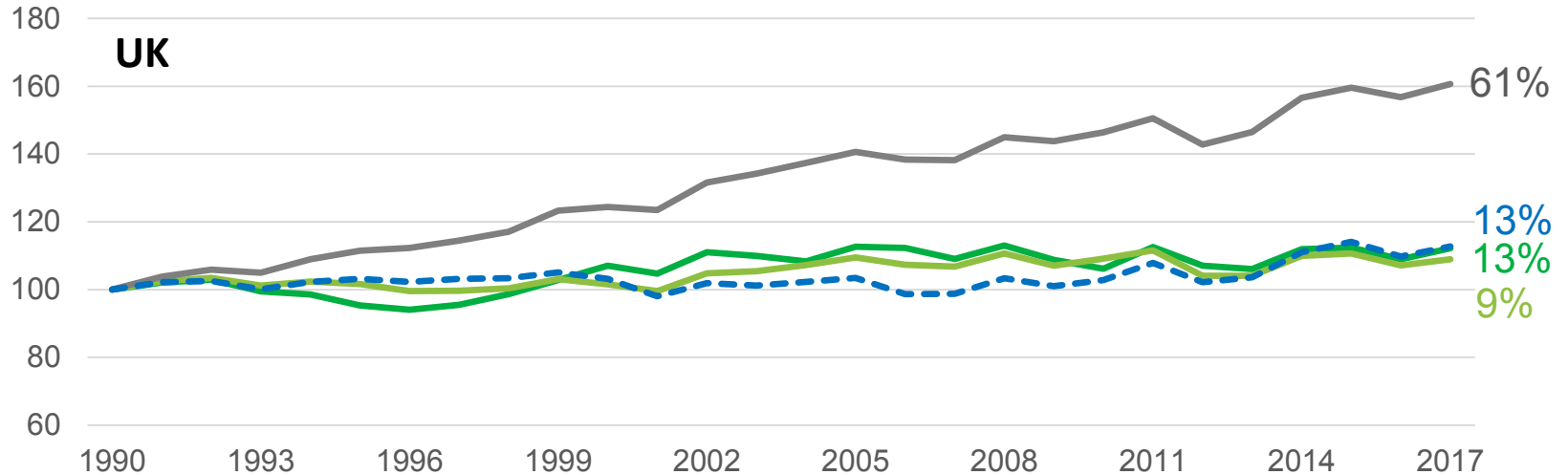
- The following results are experimental statistics, indicating that they are an initial work using new methodology. The results may be revised as we continue working on it.
- All results are for England and cover the period 1990/91 to 2017/18
- Published 27th June 2019

Comparison to UK TFP

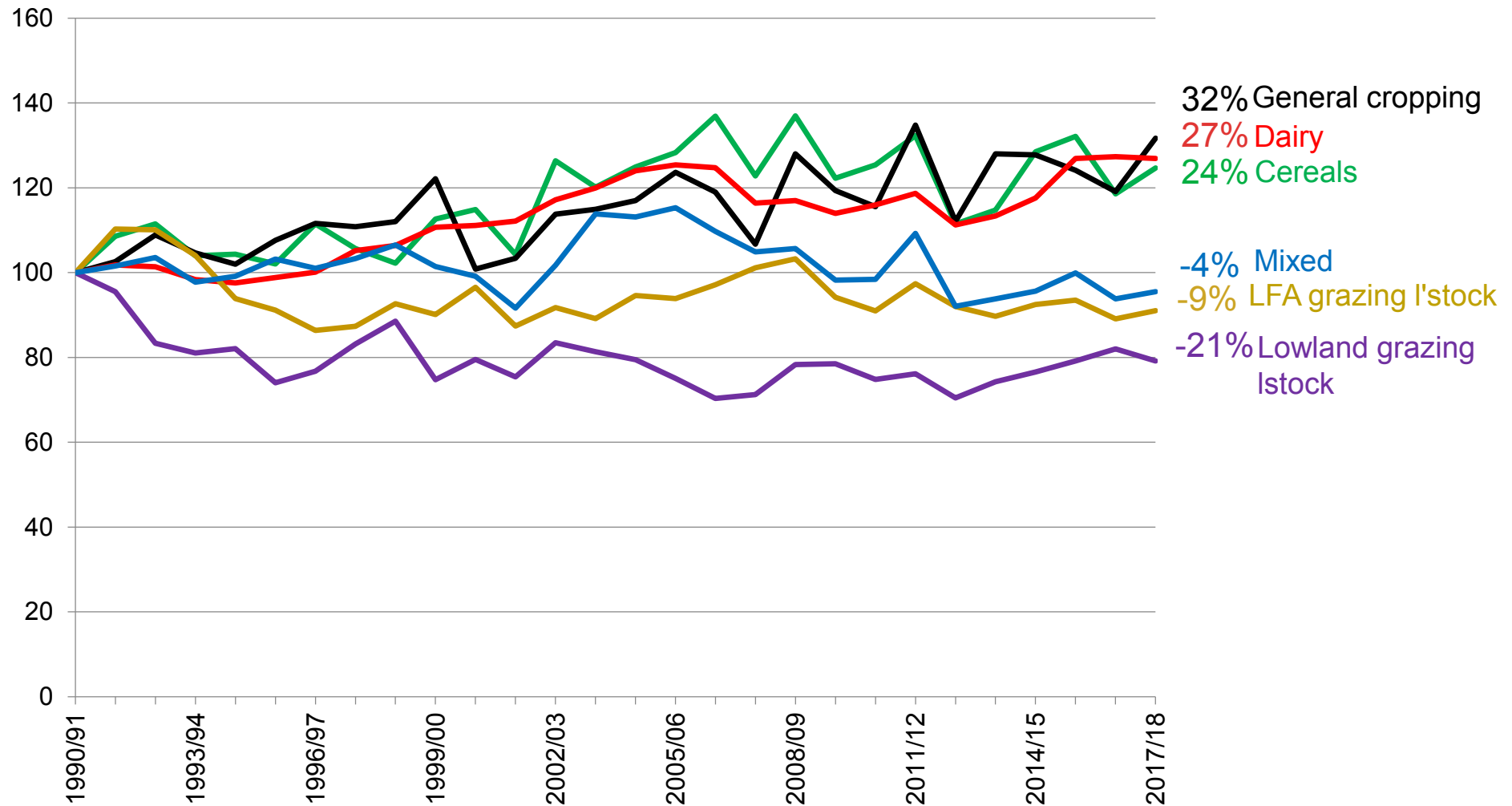
(1990=100)



Partial productivity – methodology differences?

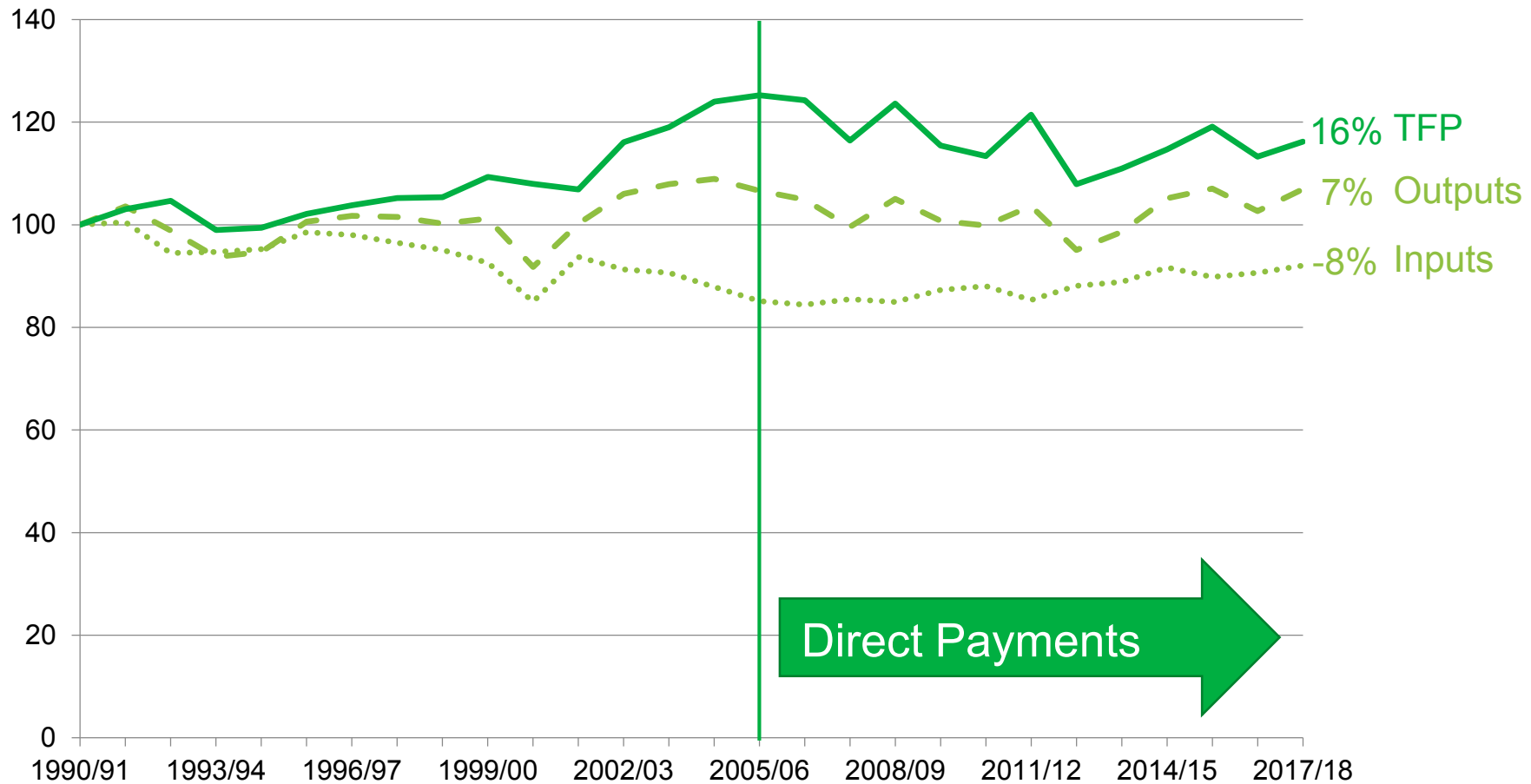


Summary of results - TFP by farm sector, England

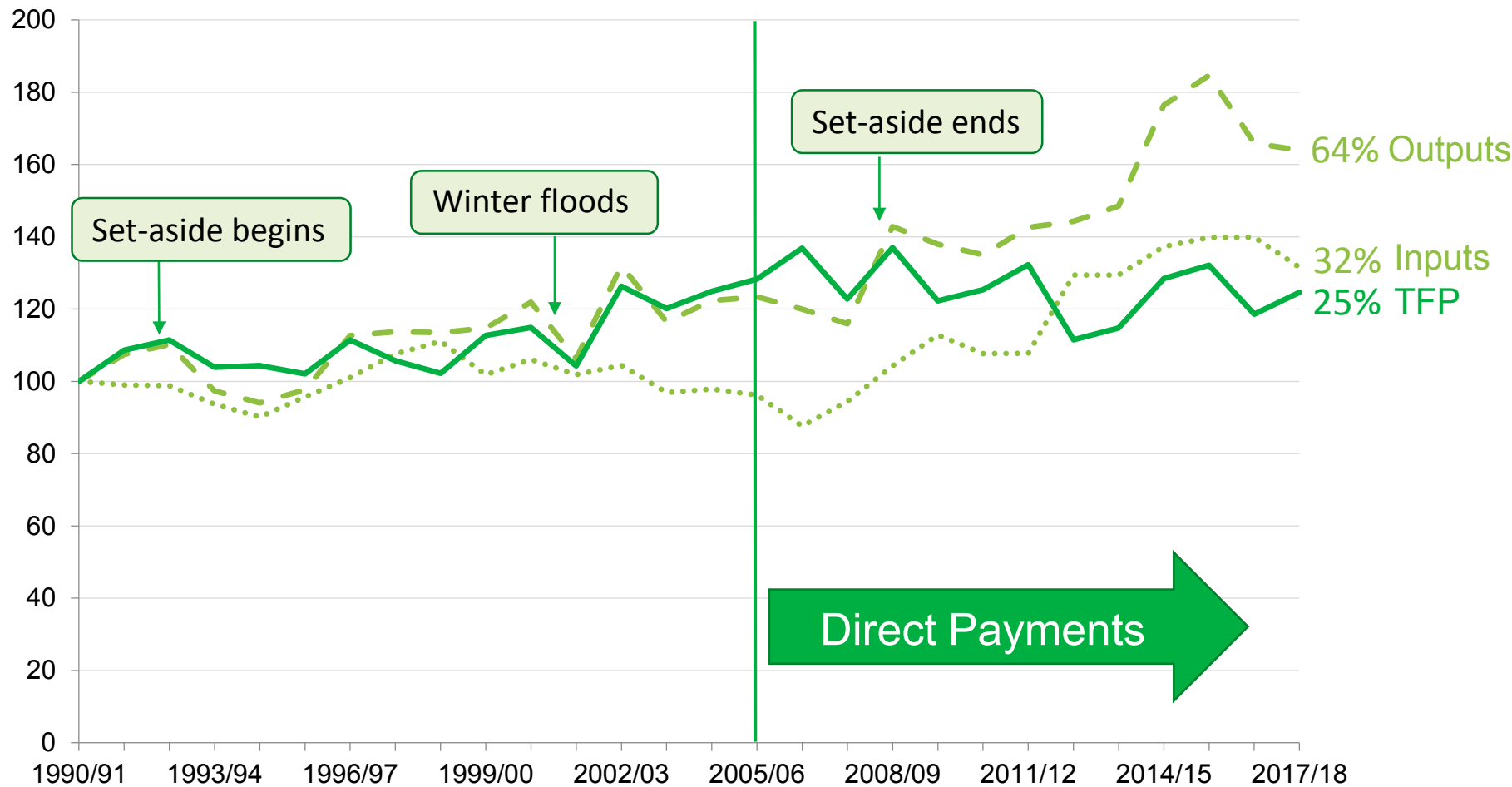


All farms – England, FBS

(1990=100)

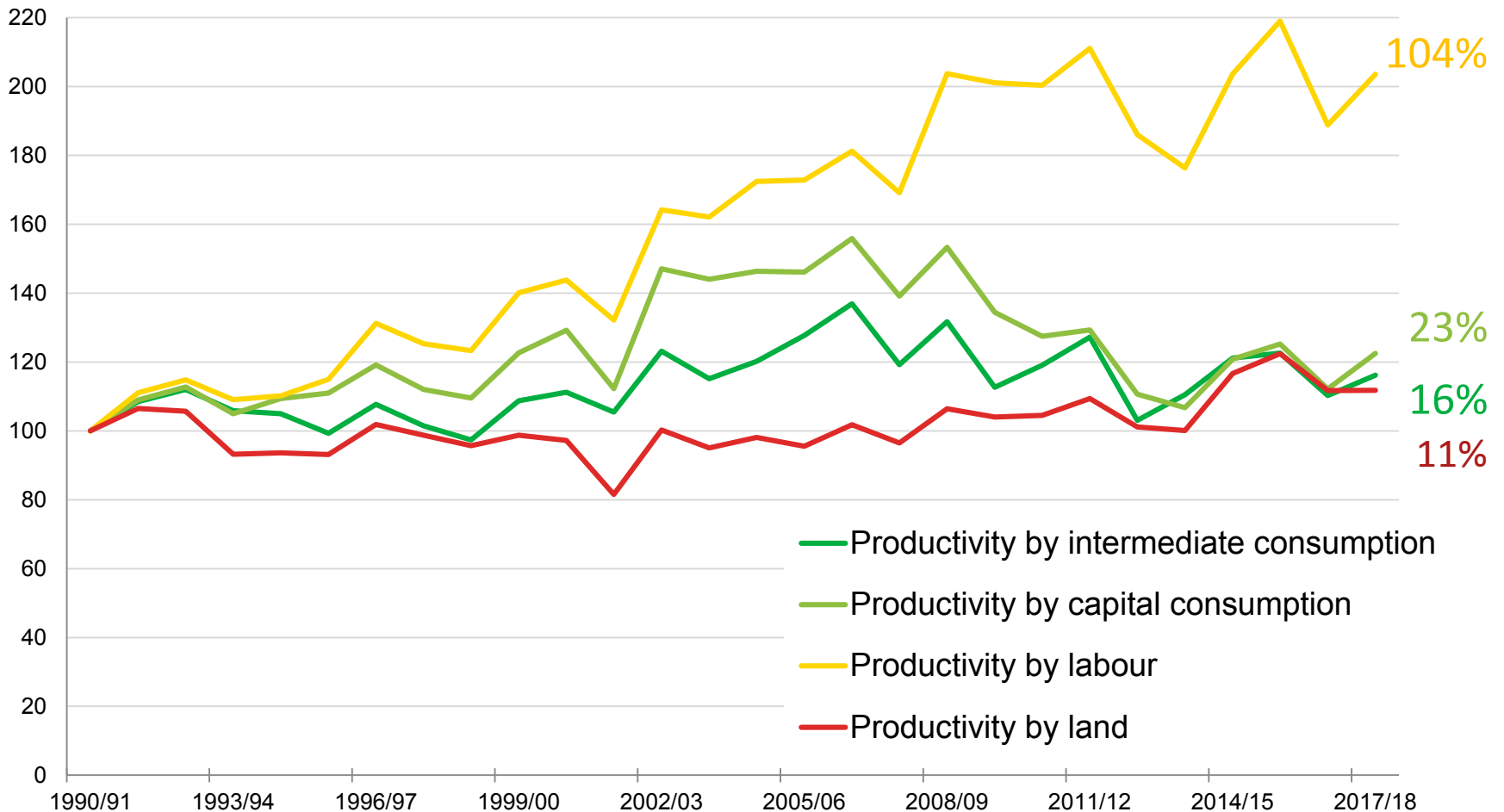


Cereals – total factor productivity (1990=100)

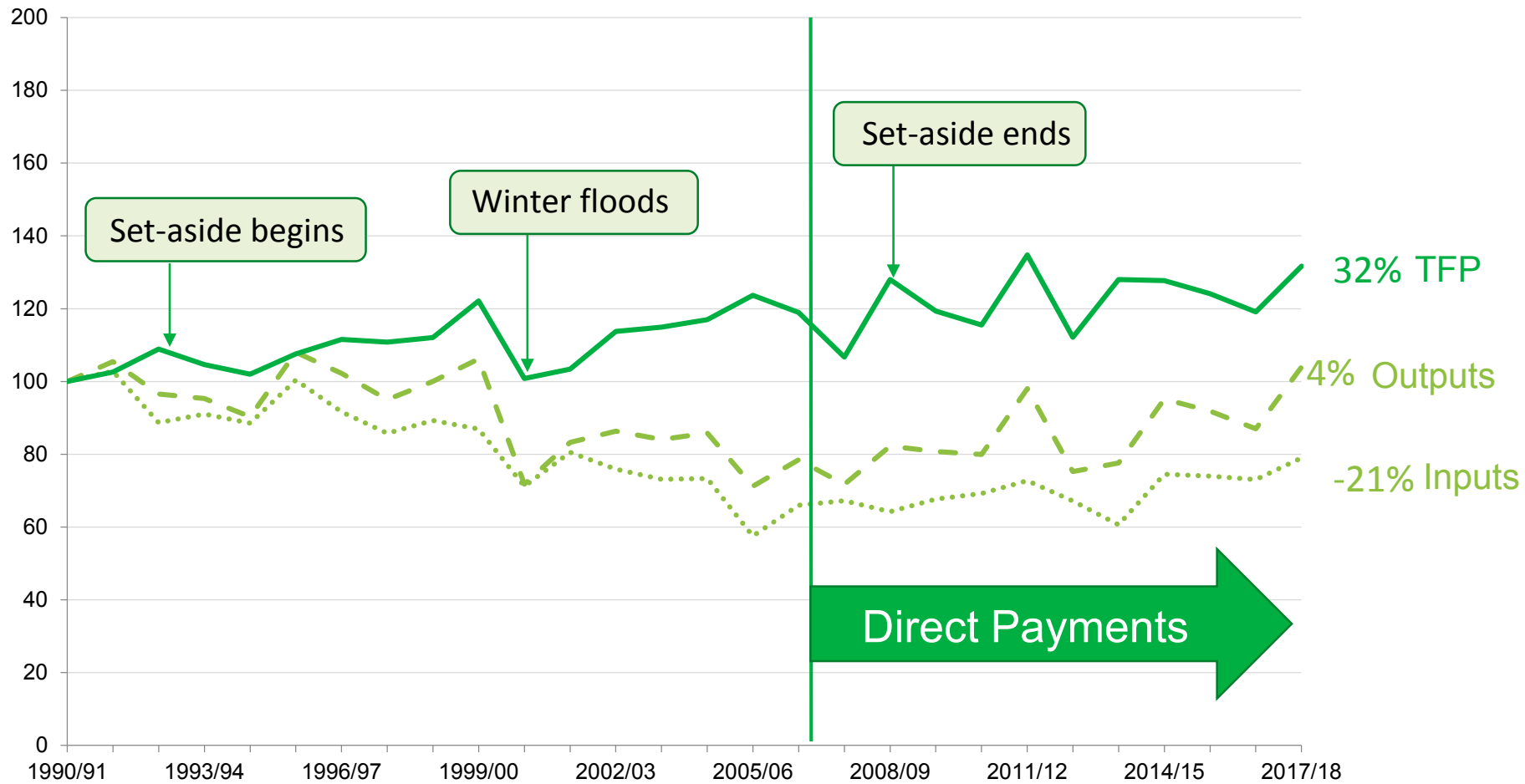


Cereals – partial factor productivity

(1990=100)

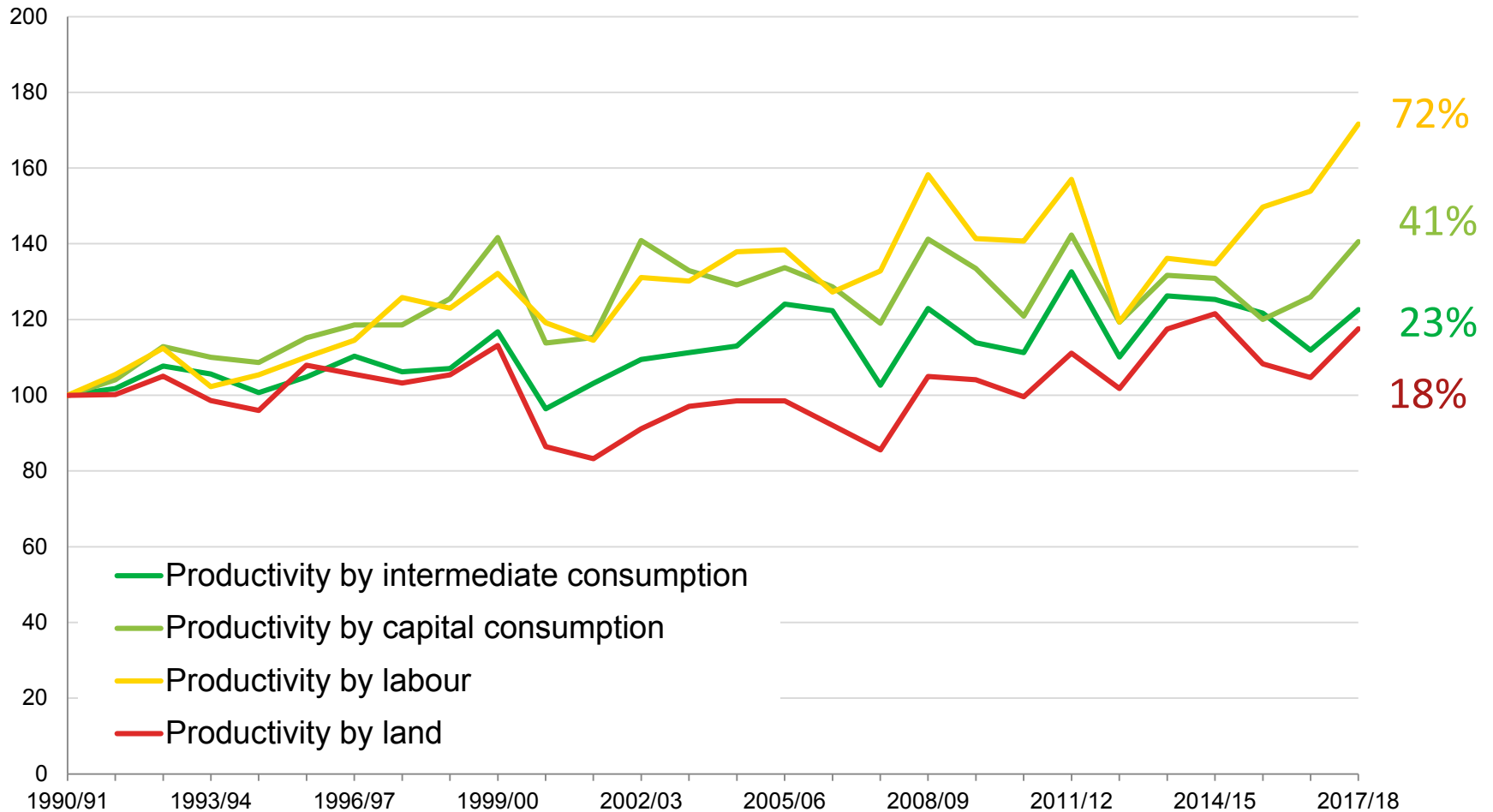


General Cropping – total factor productivity (1990=100)

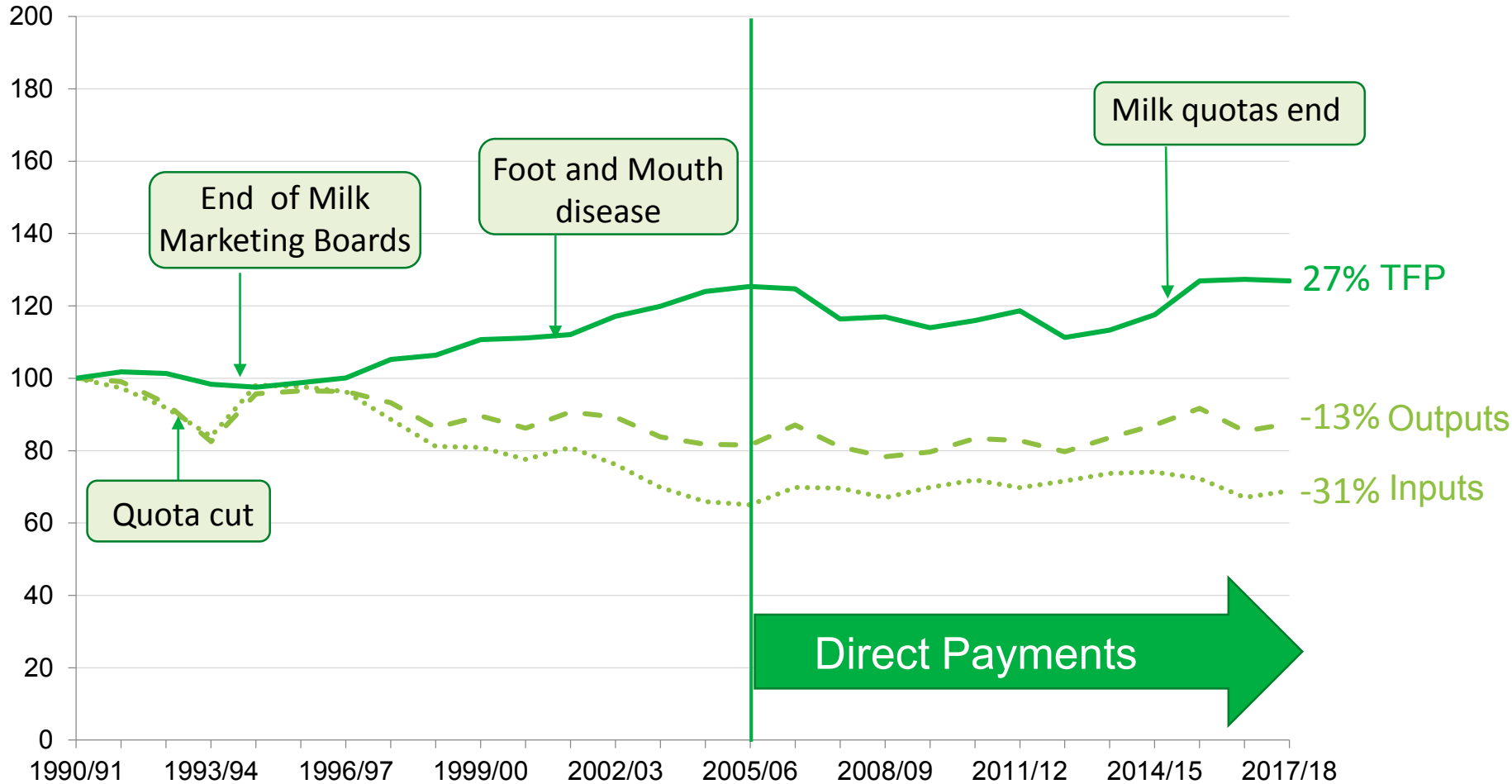


General Cropping – partial factor productivity

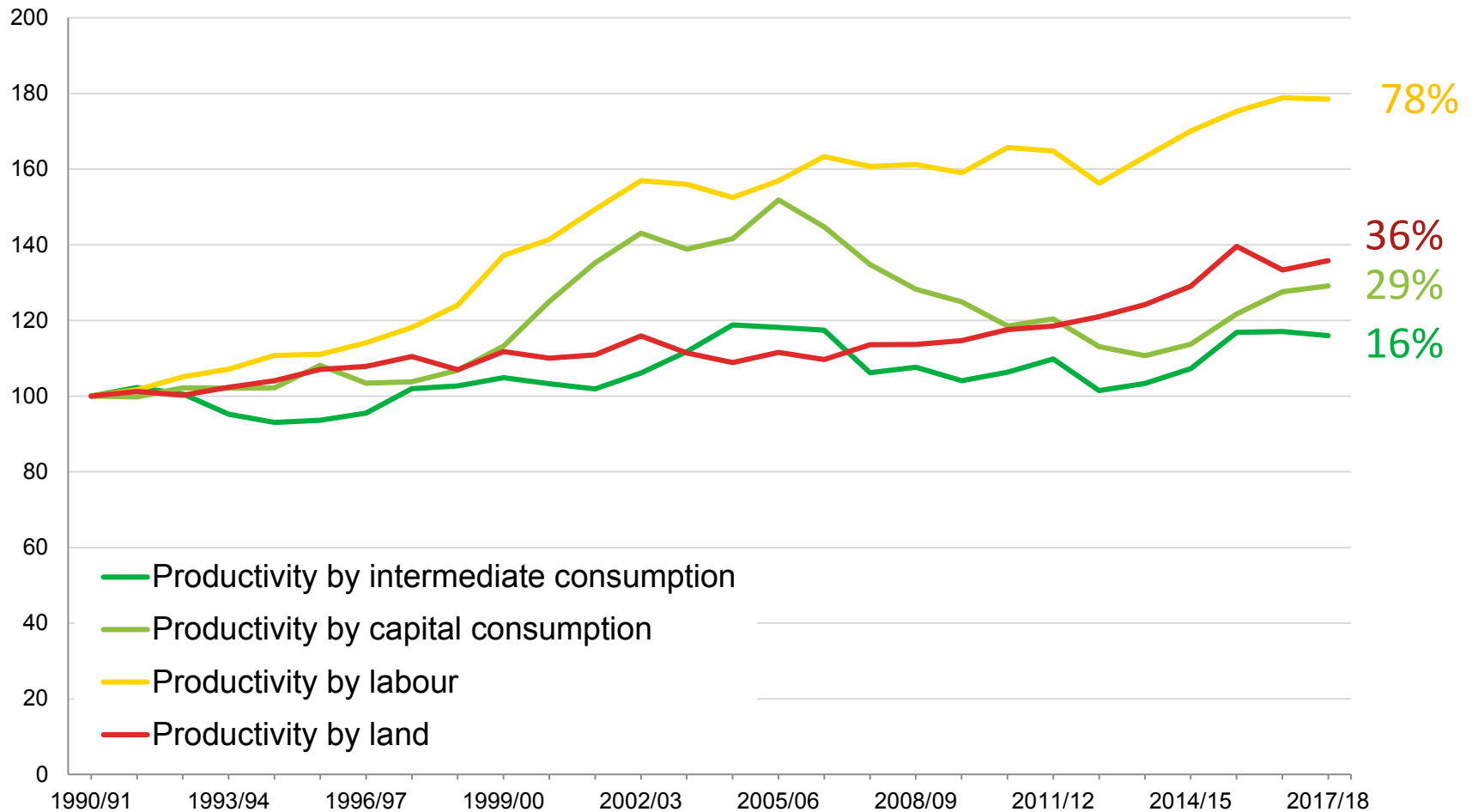
(1990=100)



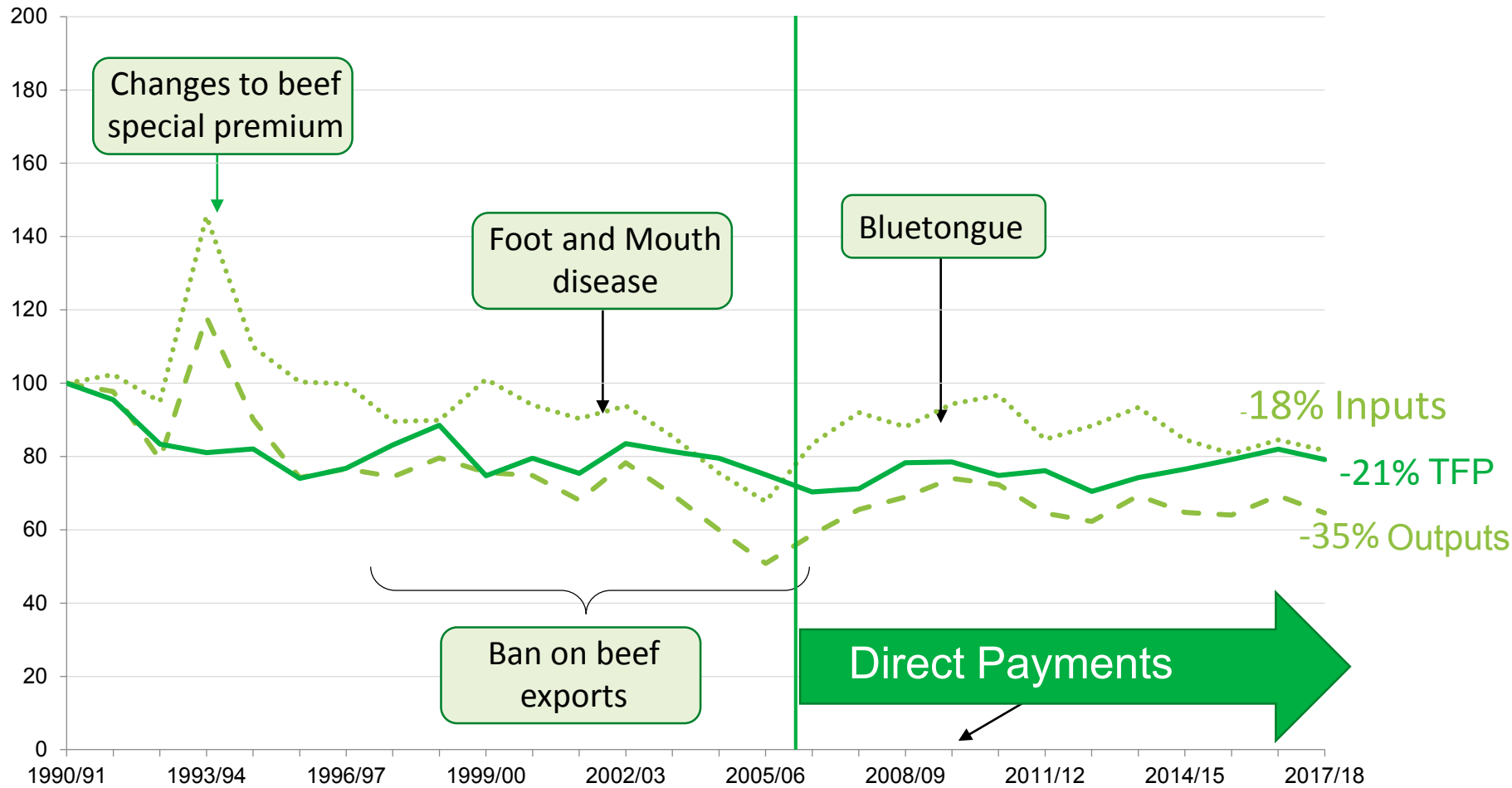
Dairy – total factor productivity (1990=100)



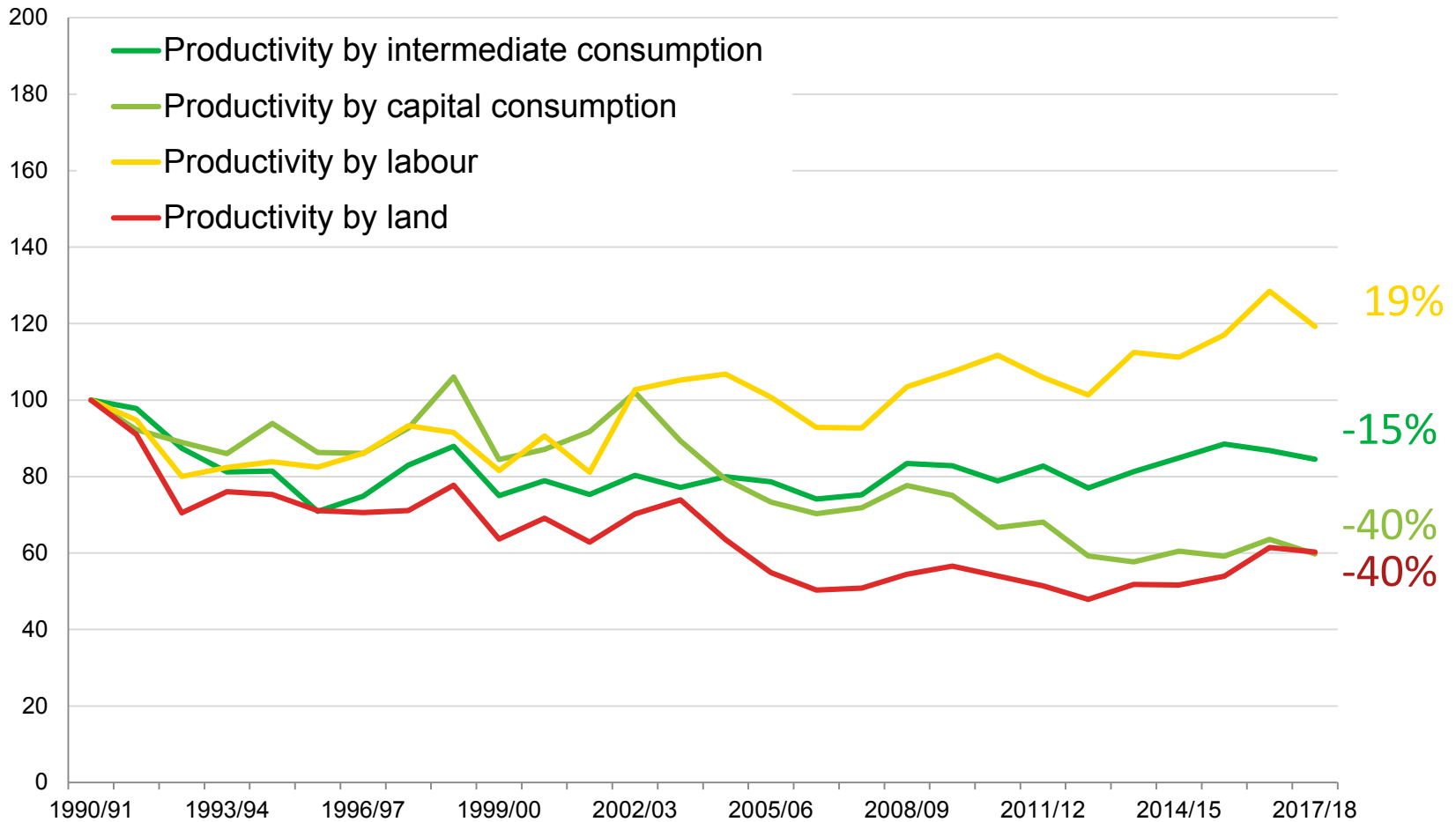
Dairy – partial factor productivity (1990=100)



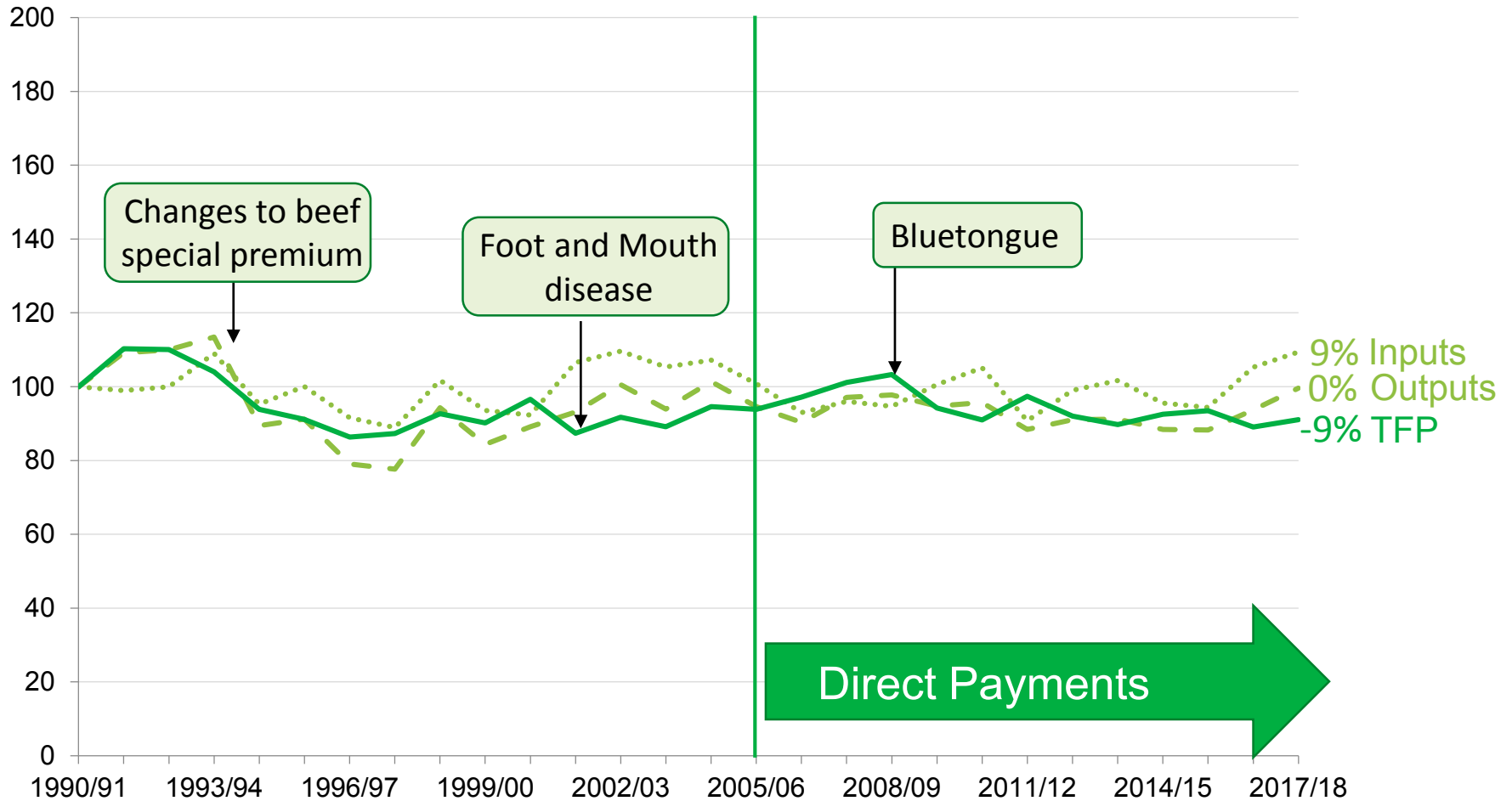
Lowland Grazing Livestock – total factor productivity (1990=100)



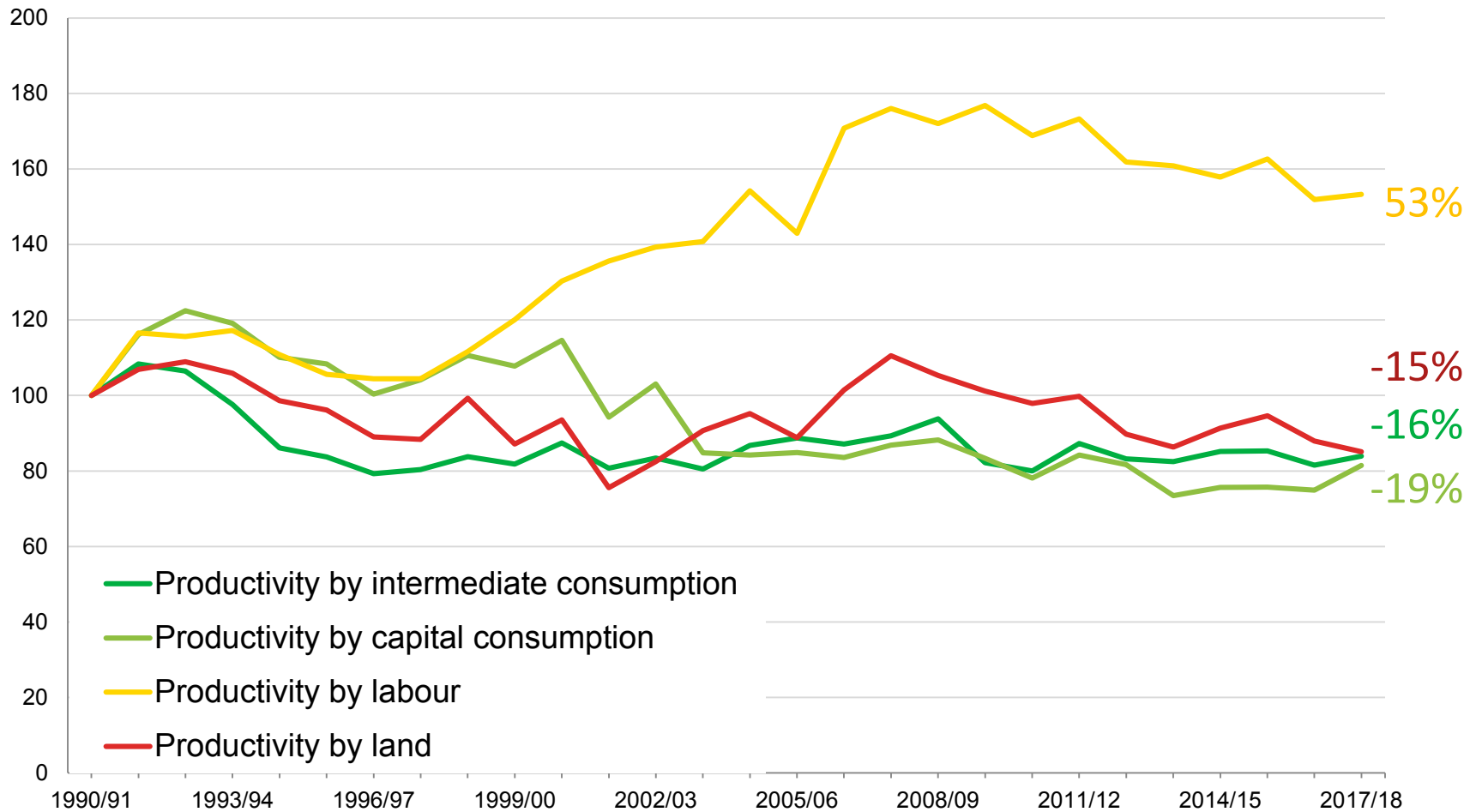
Lowland Grazing Livestock – partial factor productivity (1990=100)



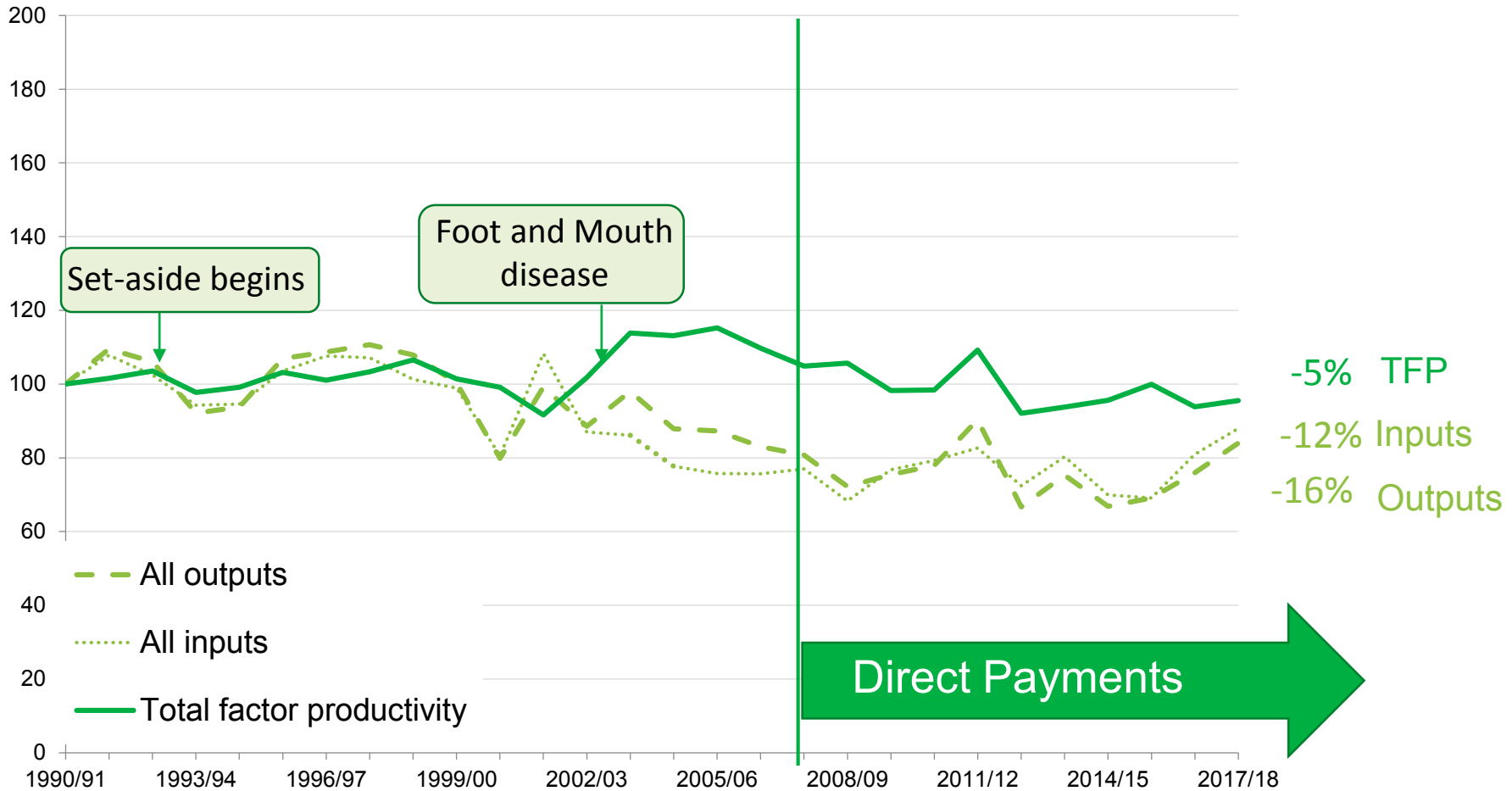
LFA Grazing Livestock – total factor productivity (1990=100)



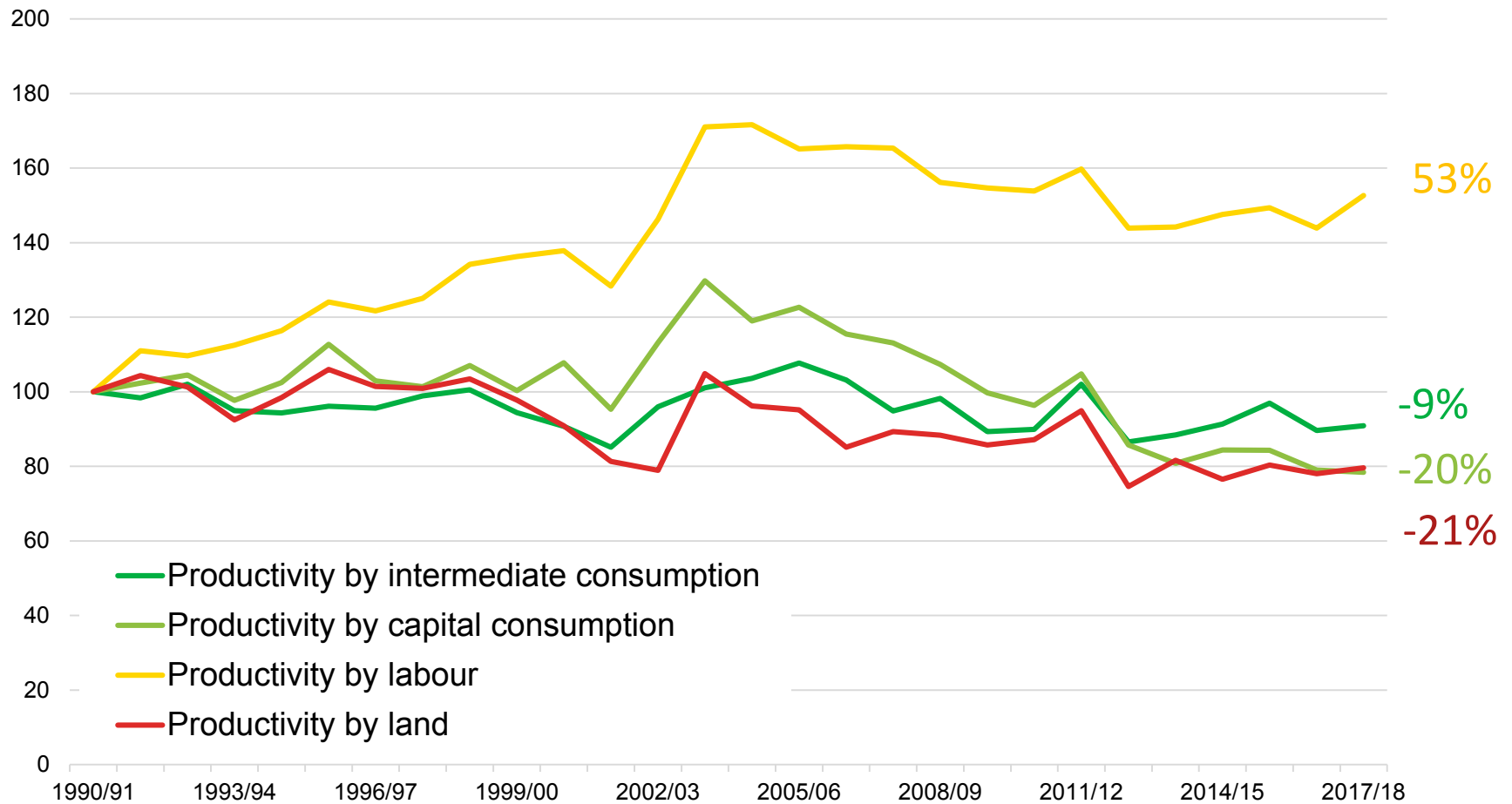
LFA Grazing Livestock – partial factor productivity (1990=100)



Mixed – total factor productivity (1990=100)



Mixed – partial factor productivity (1990=100)



Next steps

- Investigate TFP measures for other factors?
 - Tenure (owner occupies, rented)?
 - Region?
 - Age?
 - Performance?
- Need feedback from users – in terms of methodological developments and the results

Contact us at:

fbs.queries@defra.gov.uk

Joanna.Hutchinson@defra.gov.uk