

Aggregate productivity VAT¹

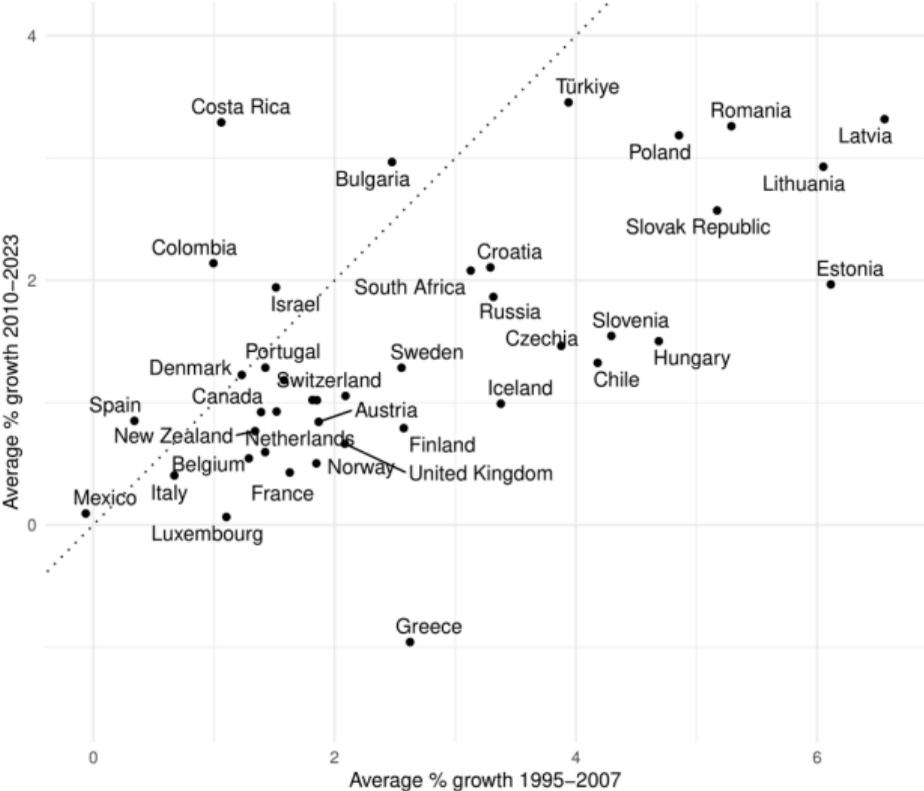
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2025

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Motivation: decline in productivity growth and dynamism



Motivation: decline in productivity growth and dynamism

UK economy [+ Add to myFT](#)

How bad will UK productivity downgrade be for Reeves?

OBR's more pessimistic view adds to pressure on chancellor to breach Labour manifesto pledge on tax



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Delphine Strauss and **Sam Fleming** in London

Published OCT 28 2025 55

A likely downgrade to the outlook for UK productivity will carve a bigger hole than expected in Rachel Reeves' fiscal plans, the Financial Times revealed on Monday — just as better economic data was starting to offer the chancellor some respite in the run-up to next month's Budget.

The Office for Budget Responsibility's [switch to a more pessimistic view](#) of the economy's potential will increase

Motivation: decline in productivity growth and dynamism

BBC

Why does lower productivity mean tax rises are more likely?

5 November 2025

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Ben Chu
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Chancellor Rachel Reeves is contemplating tax rises in her Budget on 26 November.

And she has said one of the key reasons is that the government's official forecaster, the Office for Budget Responsibility (OBR), is going to lower its UK productivity growth forecast for the coming years.

So why would lower UK productivity forecasts lead to tax rises?

Motivation: decline in productivity growth and dynamism

News Opinion Sport Culture Lifestyle

Business Economics Banking Money Markets Project Syndicate B2B Retail

Economics

Timeline

How the standoff between Rachel Reeves and the OBR unfolded

Treasury's independent economic forecaster says outlook for economy rosier than chancellor led everyone to believe

- OBR chair quits after inquiry into early release of Reeves's budget

Phillip Inman
Tue 2 Dec 2025 05:04 AEDT

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📍 Rachel Reeves has denied lying to the public in the buildup to last week's budget. Photograph: Adrian Dennis/PA

Rachel Reeves has been **accused of overstating** the damage to the UK's public

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Motivation: decline in productivity growth and dynamism

Examine the consistency and usefulness for research purposes of administrative tax data from UK firms, particularly looking at decomposing contributions to output and productivity growth. (Kauma & Mion, 2025; Labonne & Weale, 2020; Barrand et al, 2021; Mion, 2018; ONS 2017, ONS 2018 on VAT. Galanackis & Savagar, 2025; Palmou & Jones, 2025; Wales et al, 2016 as examples for similar UK administrative data.)

Decline in business dynamism – how much does this relate to lower trend productivity growth? E.g. Decker et al, 2020, Ates & Akcigit, 2023, Biondi et al, 2023, OECD, multiple. (In the UK e.g. Bailey et al, multiple. Schneider, 2019.)

Key to business dynamism is observing firms longitudinally, for which we need the comprehensiveness of administrative data. Official economic surveys are designed to minimise respondent burden by rotating firms in and out.

Data: Annual Business Survey

- Workhorse production survey by the Office for National Statistics
- c. 50,000 respondents per year
- Hybrid survey-census, the c.20,000 firms with over 250 workers will always be given survey forms, smaller firms sampled representatively
- Detailed questions tailored to economics/national accounts concepts
- Not fast, wait for firms to produce their annual accounts, and then chasing/processing/validation

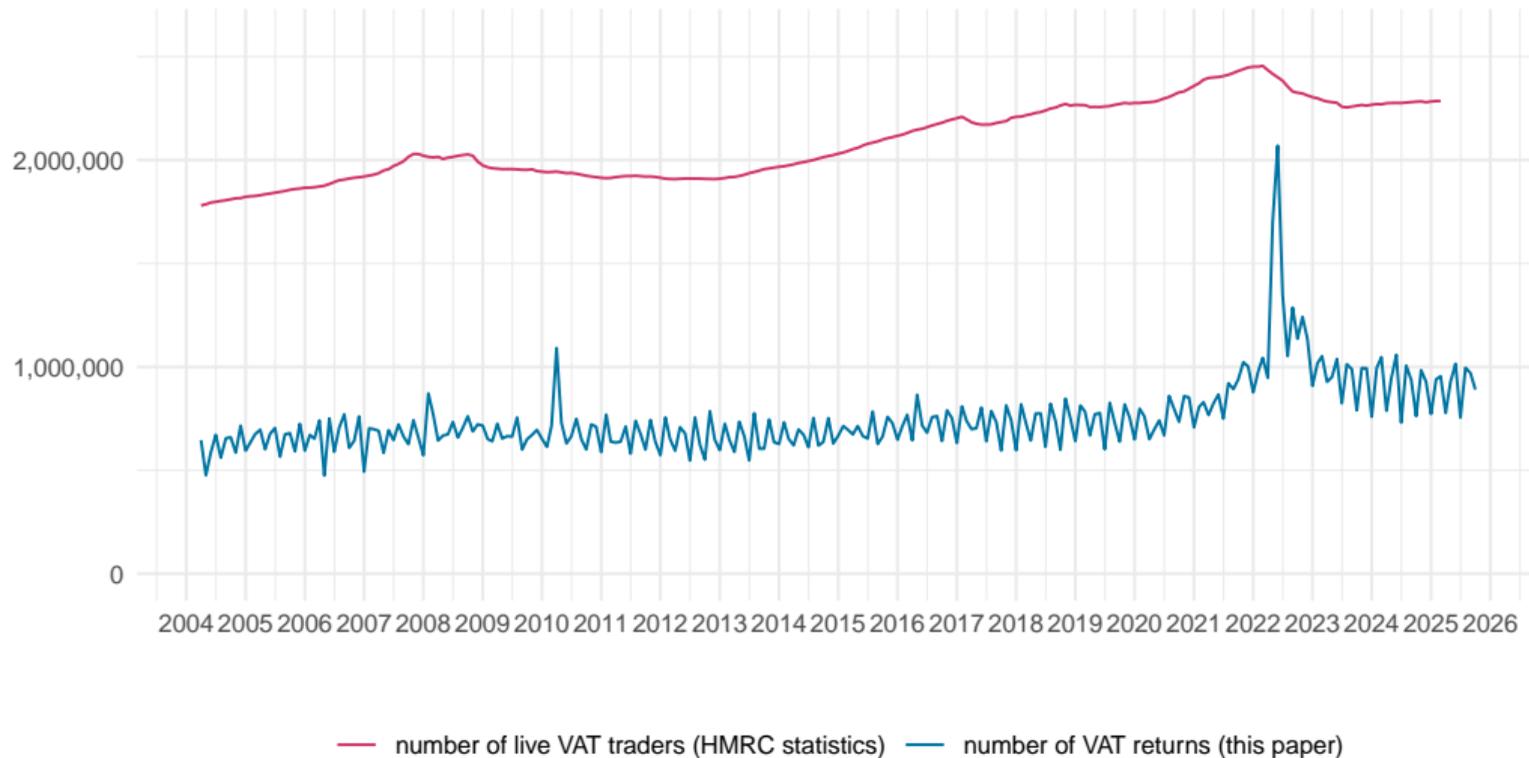
Pay 20% tax on your sales as a business.

But you get to deduct the 20% from anything you have purchased as a business.

Europe-harmonised – UK adopted VAT in order to enter the EEC in 1973.

ONS already uses annual VAT turnover to calibrate survey weights (since 1970s), and directly for short-term industry output and for regional output (since 2017).

194 million VAT returns used over the period



HM Revenue & Customs
Value Added Tax Return

For official use

Registration Number Period

If your completed return and all the VAT payable are not received by the due date you will be in default and may be liable to a financial penalty

Due Date:

For official use
D O R
only

Please read the notes on the back before you fill in this form or if you use a special VAT accounting scheme. Fill in all boxes clearly in black ink, and write 'none' where necessary. Don't put a dash or leave a box blank. If there are no figures write '0' in the penic columns. Do not enter more than one amount in any box. If there is a minus amount in boxes 1 to 4, enclose the figure in brackets.

For official use		E	P
VAT due in this period on sales and other outputs	1		
VAT due in this period on acquisitions from other EC Member States	2		
Total VAT due (the sum of boxes 1 and 2)	3		
VAT reclaimed in this period on purchases and other inputs (including acquisitions from the EC)	4		
Net VAT to be paid to HMRC or reclaimed by you (Difference between boxes 2 and 4)	5		
Total value of sales and all other outputs excluding any VAT. Include your box 8 figure	6		00
Total value of purchases and all other inputs excluding any VAT. Include your box 9 figure	7		00
Total value of all supplies of goods and related costs, excluding any VAT, from other EC Member States	8		00
Total value of all acquisitions of goods and related costs, excluding any VAT, from other EC Member States	9		00

DECLARATION You, or someone on your behalf, must sign below. A false declaration can result in prosecution.
Full name of signatory (in capital letters) I, declare that the information given above is correct and complete to the best of my knowledge and belief.
Signature Date DD MM YYYY

VAT100 v05C PAGE 1 HMRC 08/09

Online VAT returns
If you would prefer not to continue completing this paper version of the VAT return, you can apply to file an electronic version online. You can find out more about online VAT returns at www.hmrc.gov.uk
How do I fill in my VAT return?
A summary of how to fill in each box is shown below. Detailed information on how to fill in this form is in HMRC 700/12 Filing in your VAT return. This is available online at www.hmrc.gov.uk If you need any further advice on filling in your return, please phone our Helpline on 0845 615 8000.
There is also an online guide on completing your VAT return at www.hmrc.gov.uk by selecting 'VAT' followed by 'VAT returns and accounts' and 'VAT Returns: how to complete and submit a return box by box'.

Box 1
Enter the VAT due on all goods and services you supplied.

Box 2
Enter the VAT due from you on purchases of goods (and related costs) from VAT registered customers in other Member States of the European Community.

Box 3
Enter the total of boxes 1 and 2 added together. This is your 'output VAT' for the period.

Box 4
Enter the total amount of VAT charged on your business purchases. This is your 'input VAT' for the period.

Box 5
Take the figures in boxes 3 and 4 and deduct the smaller amount from the larger amount. Enter the difference in box 5. If this amount is under £1, you need not send any payment, nor will any repayment be made to you. However, you must still fill in this form and send it to HM Revenue & Customs Ltd.

Box 6
Enter the total value of all your business sales but leave out any VAT. You must include the value of your EC supplies shown in box 6.

Box 7
Enter the total value of all your business purchases but leave out any VAT. You must include the value of your EC purchases shown in box 7.

Box 8
Enter the total value of supplies of goods (and related costs) supplied to other EC Member States. Leave out any VAT. If you enter an amount in box 8 you must also include that amount in your box 6 entry.

Box 9
Enter the total value of goods (and related costs) purchased from other EC Member States. Leave out any VAT. If you enter an amount in box 9 you must also include that amount in your box 7 entry.

What if I use a special VAT accounting scheme?
If you use a VAT accounting scheme there are different rules for completing some of the boxes on the VAT return. For further information, please see section 4 of Notice 700/12 Filing in your VAT return if you use any of the following schemes:
• Flat Rate Scheme,
• Cash Accounting Scheme,
• Annual Accounting Scheme,
• Margin Scheme for second-hand goods,
• or,
• supply or receive goods under reverse charge accounting arrangements,
• see in the Payments on Account (POA) regime.

How do I correct errors made on previous returns?
You may be able to correct errors on VAT returns for the preceding three years by using boxes 1 and 4 on the return for the period of discovery. Net errors of £10,000 or less can be included in your return. Net errors between £10,000 and £50,000 can be included provided they do not exceed 1% of the total value of your sales (before correction) shown in box 6. Net errors exceeding £50,000 and those above £10,000 that exceed 1% of the box 6 amount must be separately notified. For further information see Notice 700/05. How to correct VAT errors and make adjustments or claims.

How do I pay?
Information on how to pay is also available on our website at www.hmrc.gov.uk by selecting 'Paying HMRC' followed by 'VAT' or by phoning our Helpline on 0845 615 8000. Please allow enough time for payment to reach us by the due date. We suggest you allow at least three working days for this. If the due date falls on a weekend or bank holiday please ensure payment is received by the previous bank working day.

1. Direct payment
Using the Internet, telephone banking, BACS Direct Credit or CHAPS, provide your bank or building society with the following information to make a direct payment:
• payment amount
• account name: HMRC VAT
• sort code: 08-92-00
• account number: 11903150
• your VAT registration number.

2. At your bank
If your bank or building society offers this service we can send you a book of payables to use. Phone us on 01752 360378 or 01752 360314 or email electronicpayments@hmrc.gov.uk Take the payable and payment to any branch of your bank. Other banks may not accept payment. Any cheque must be drawn on your bank, and made payable to 'HM REVENUE & CUSTOMS ONLY'.

3. Credit card or debit card
If you have a credit or debit card (except American Express or Diners Club cards) issued by a UK bank you can pay over the Internet using the BIPAY service. To make your payment you will need your:
• credit or debit card details
• VAT registration number.

If you pay by any of the above methods you may receive up to seven extra calendar days for the return and payment to reach us.

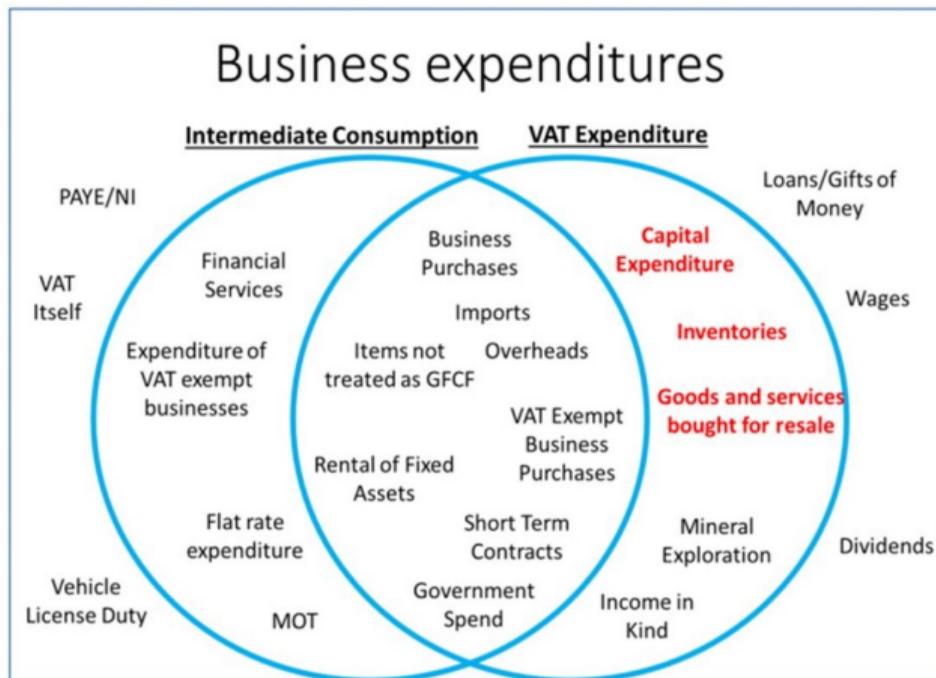
4. Post
If you use this method, make your cheque payable to 'HM REVENUE & CUSTOMS ONLY' followed by your VAT registration number and send your return and payment to us in the envelope provided. The envelope provided is for VAT payments only. You must not include any other payments.

Further information on deadlines for filing your return and making payment is available online at www.hmrc.gov.uk by selecting 'VAT' followed by 'VAT returns and accounts' and 'Deadlines for your VAT Return and payment'.

Where do I send my return?
Returns should be posted using the reply envelope provided, if you have missed this envelope, the address to send your return to is:
VAT Controller
VAT Central Unit
BSS 545

How do I notify business changes?
You must tell the Helpline Revenue Service about any changes in your business circumstances, including a change of address. You can write to:
HM Revenue & Customs
Imperial House
77 Victoria Street
Grimsby
Lincolnshire
DN21 1DB
Or go online at www.hmrc.gov.uk and select 'VAT' followed by 'Changing or cancelling your VAT registration'.

VAT100



- Comprehensive
- Fast
- Little detail
- Many biases

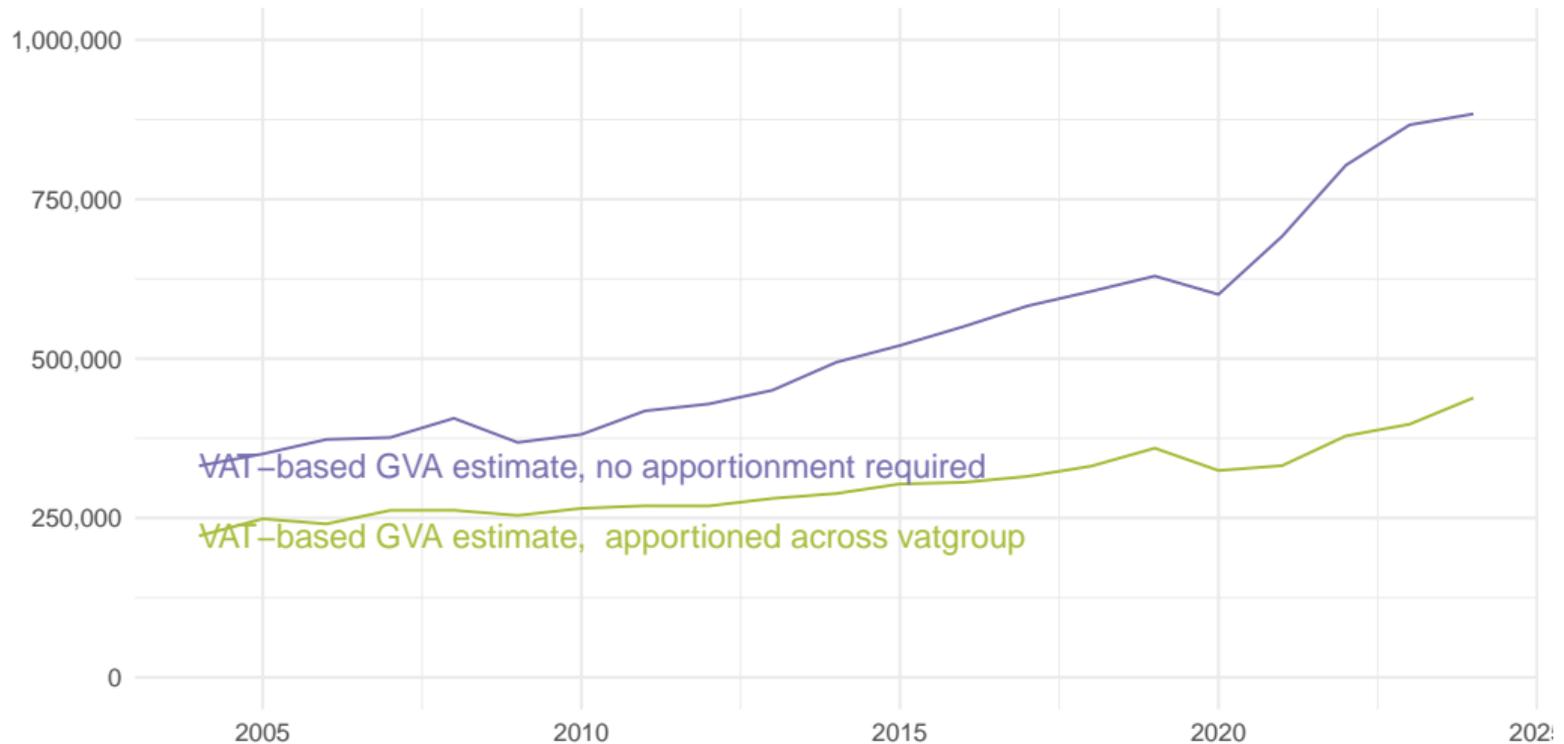
Results will be for the “core industries” – manufacturing, construction, the services excluding finance, government, health, arts/entertainment and remaining ‘other’ services.

Processing the VAT data

- Link across vatgroup structures; apportion to child enterprises and business register units
- Calendarise quarterly and annual data to months
- Isolate purchases “spikes” where the monthly purchases/sale ratio is three SDs outside its norm for the enterprise
- Calculate “medium-term value-add ratio” as rolling 18-month sales/purchases, excluding excess purchases from spikes
- Deduct fractions of VAT sales and purchases to account for capital disposals and acquisitions
- Outlier filter by deleting the most extreme values for labour productivity level, annual labour productivity growth, annual employment share change

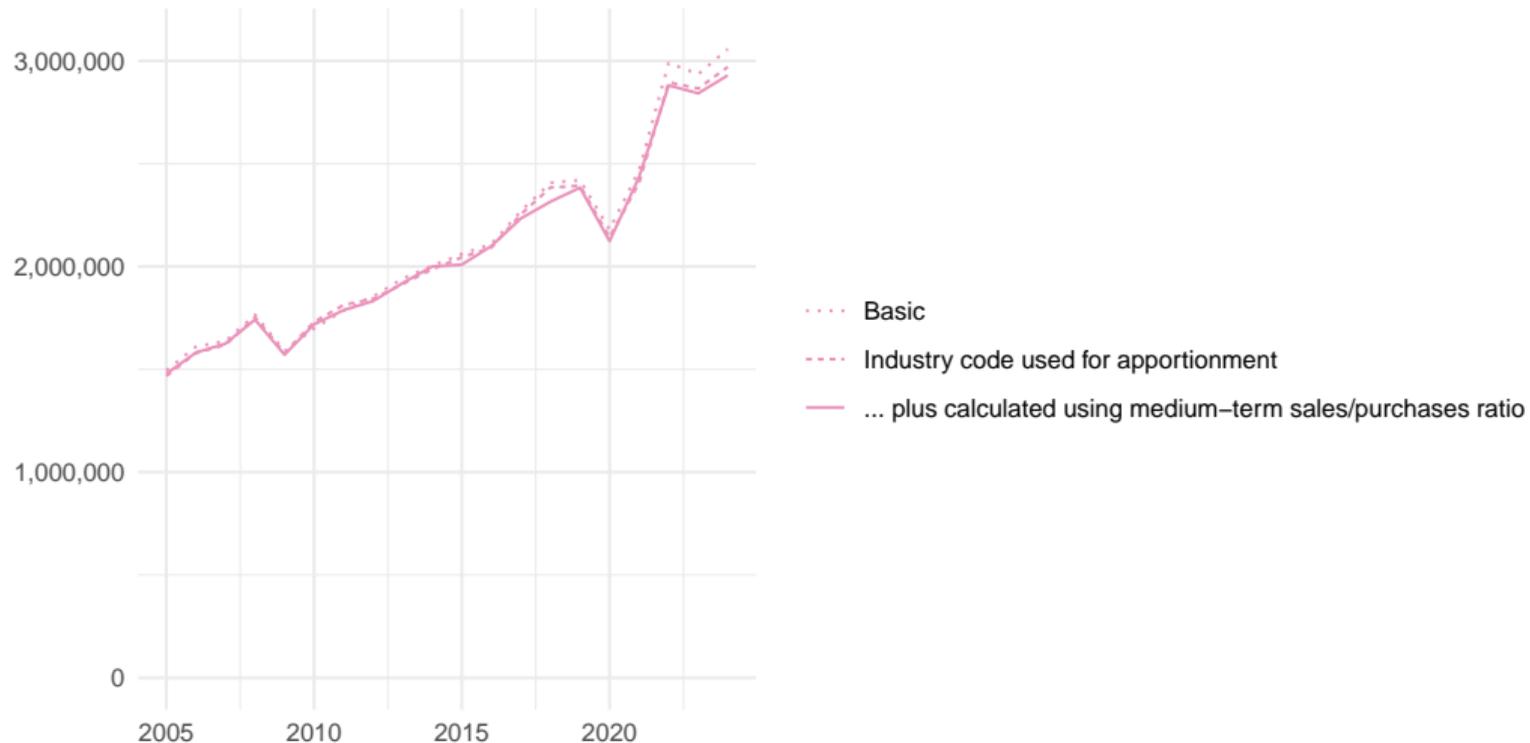
Processing the VAT data

Enterprises, enterprise groups and vatgroups: total VAT-based GVA estimate by if there is apportionment to multiple enterprises (£m, core industries)

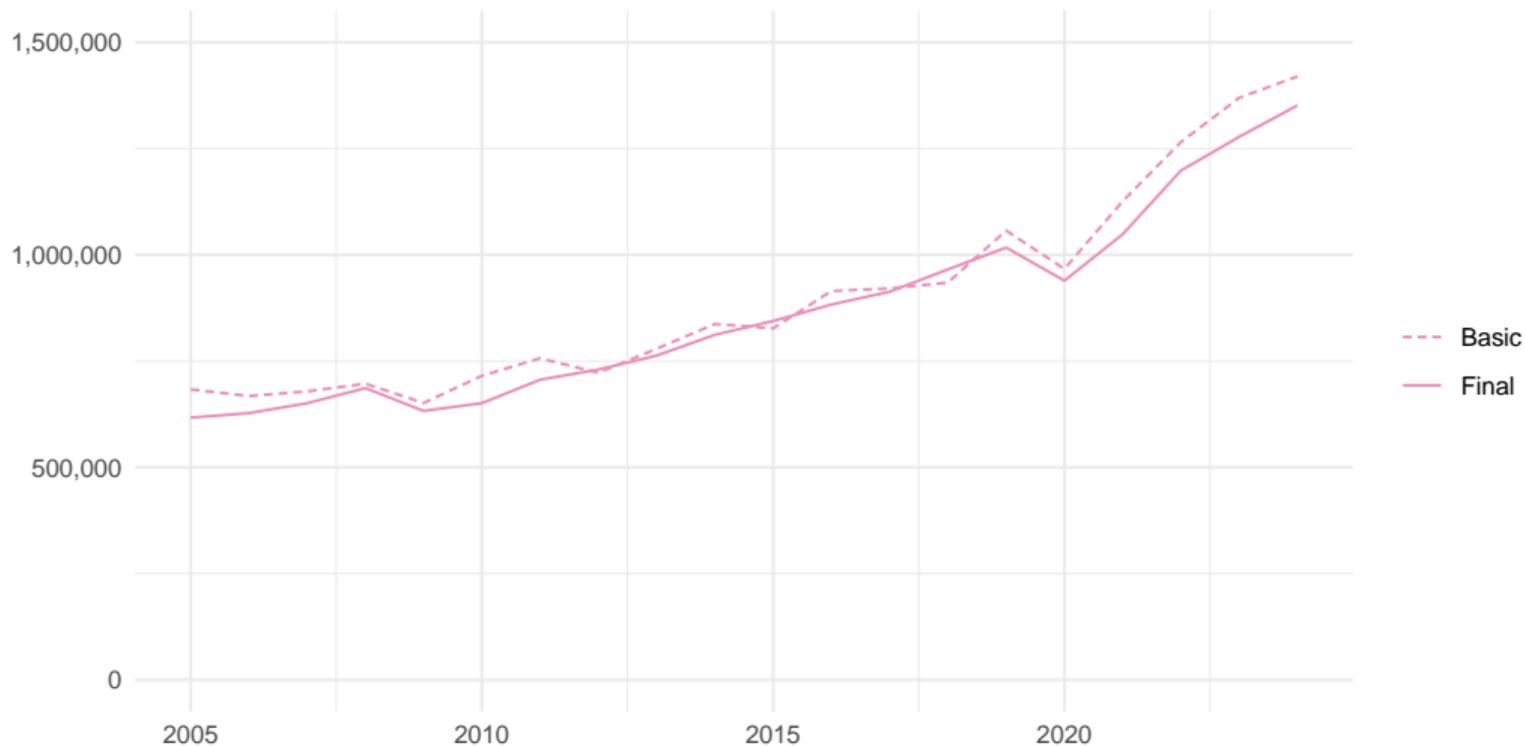


Processing the VAT data

Total VAT-based intermediate consumption estimates (£m, core industries)

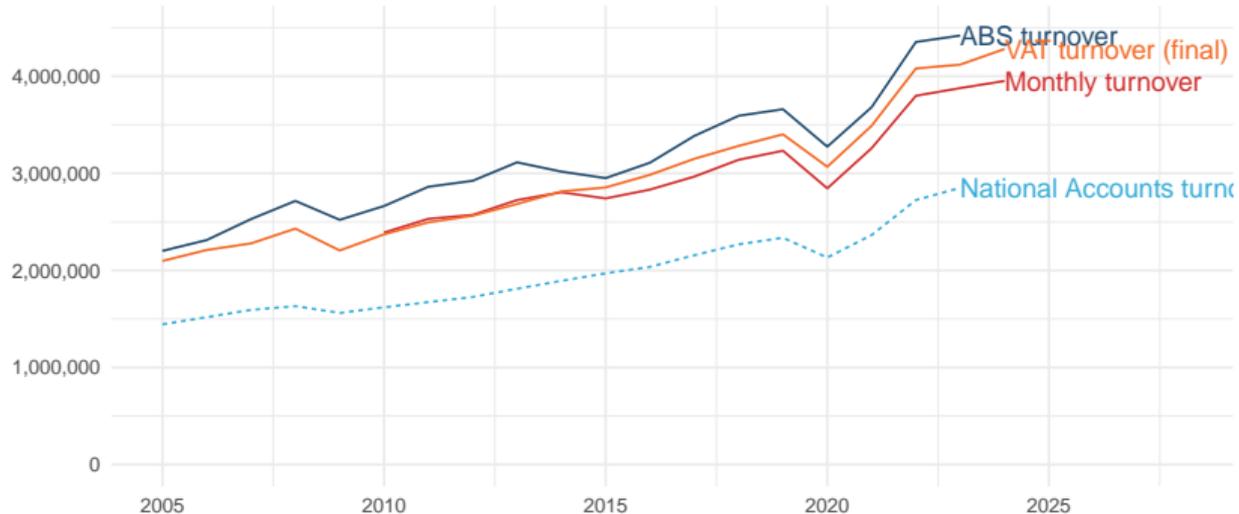


Total VAT-based GVA estimates (£m, core industries)



VAT estimates versus existing data

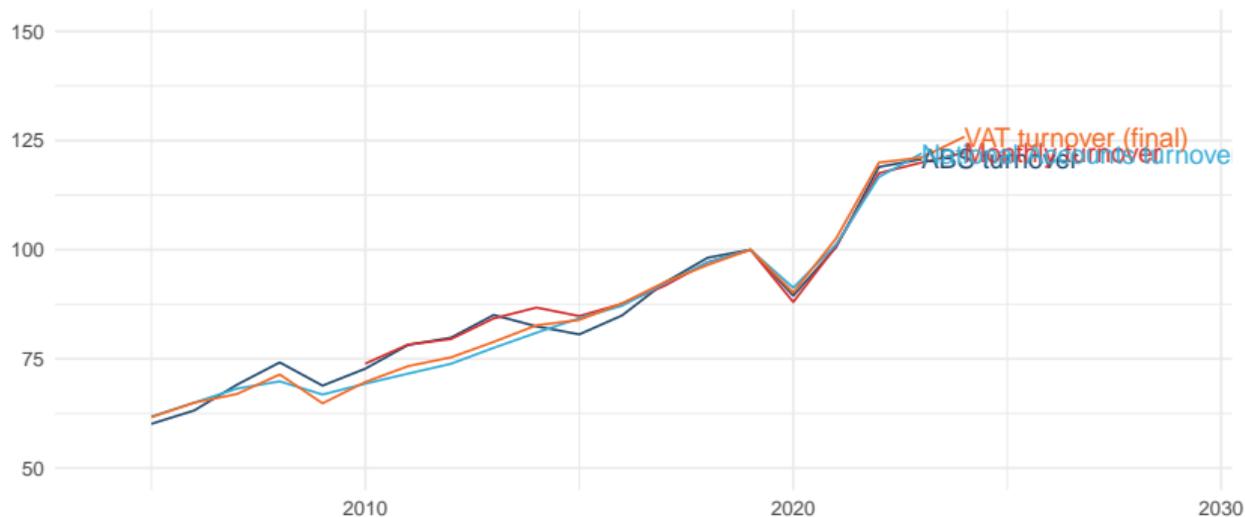
Total turnover (£m, core industries)



Monthly turnover is Retail Sales Index and Indices of Production, Services and Construction – noting that from 2016 these become a hybrid of monthly surveys and monthly VAT turnover estimates. Many factors can cause the differences, particularly how large enterprise groups in energy and elsewhere are split into “core” and other industries. National Accounts output is only to the factory gate, and only includes the distributor/retailer margin.

VAT estimates versus existing data

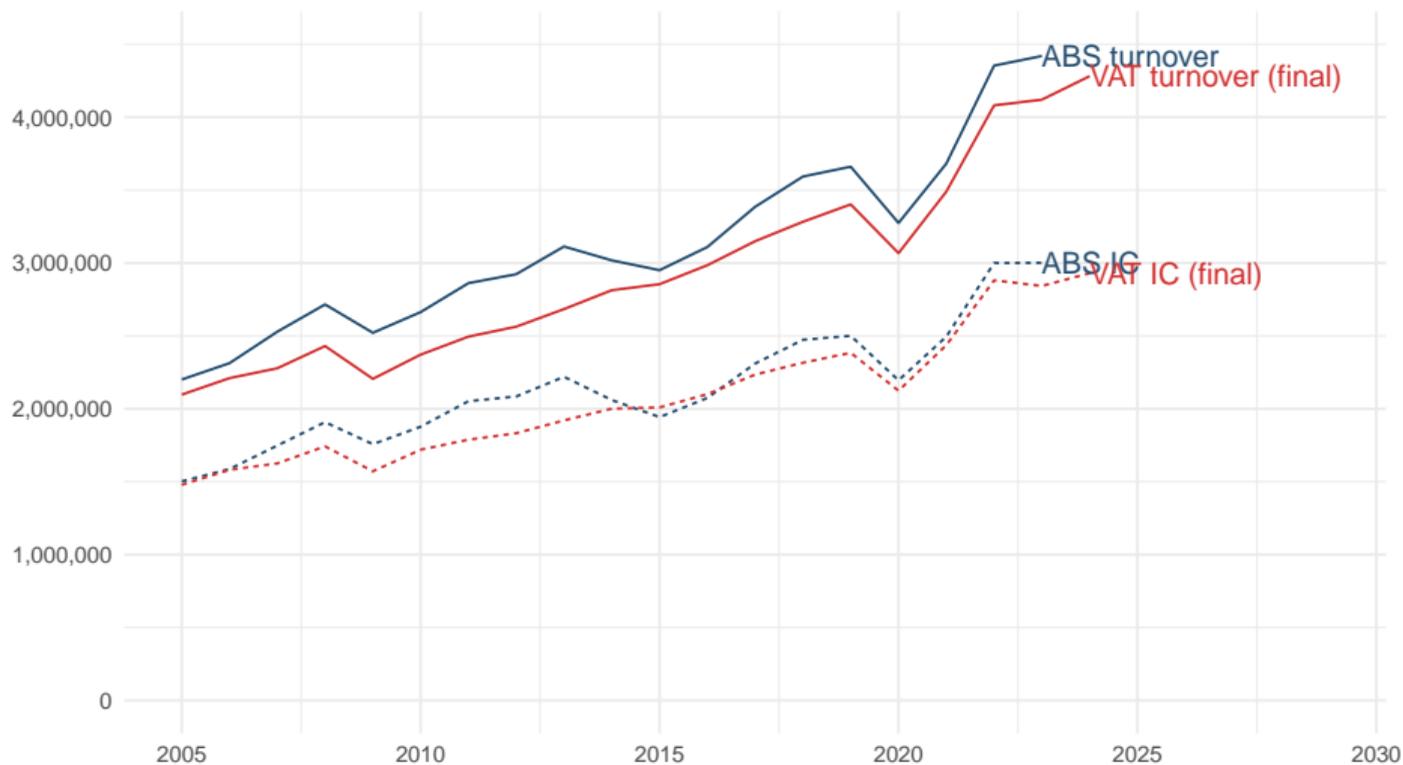
Total turnover (2019=100, core industries)



Change:	2005-2010	2011-2019	2019-2023	2023-2024
ABS turnover	-9.7	27.9	20.7	
Monthly turnover	-12.8	27.7	20.0	1.9
National Accounts turnover	-17.8	39.6	22.0	
VAT turnover (final)	-16.9	36.4	21.1	3.9

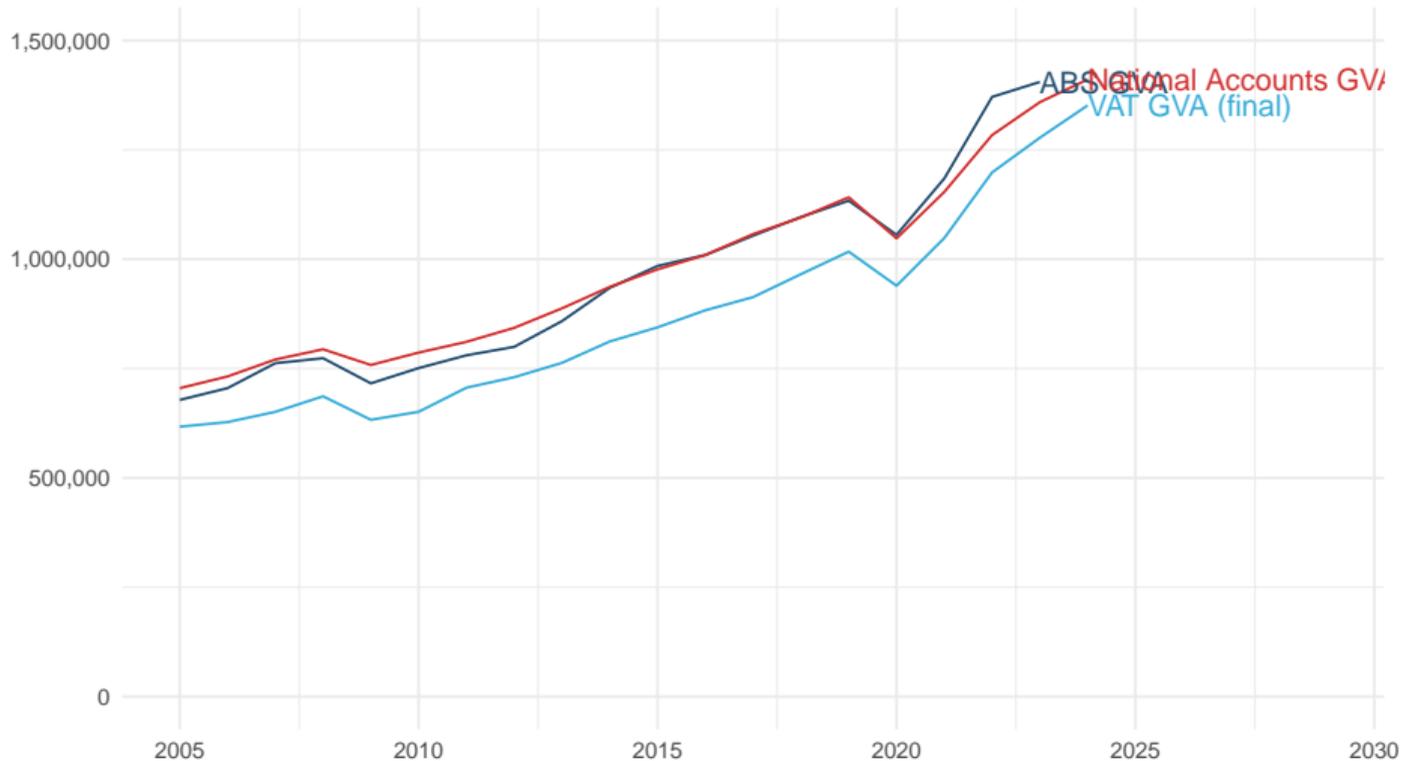
VAT estimates versus existing data

Total turnover and intermediate consumption (£m, core industries)



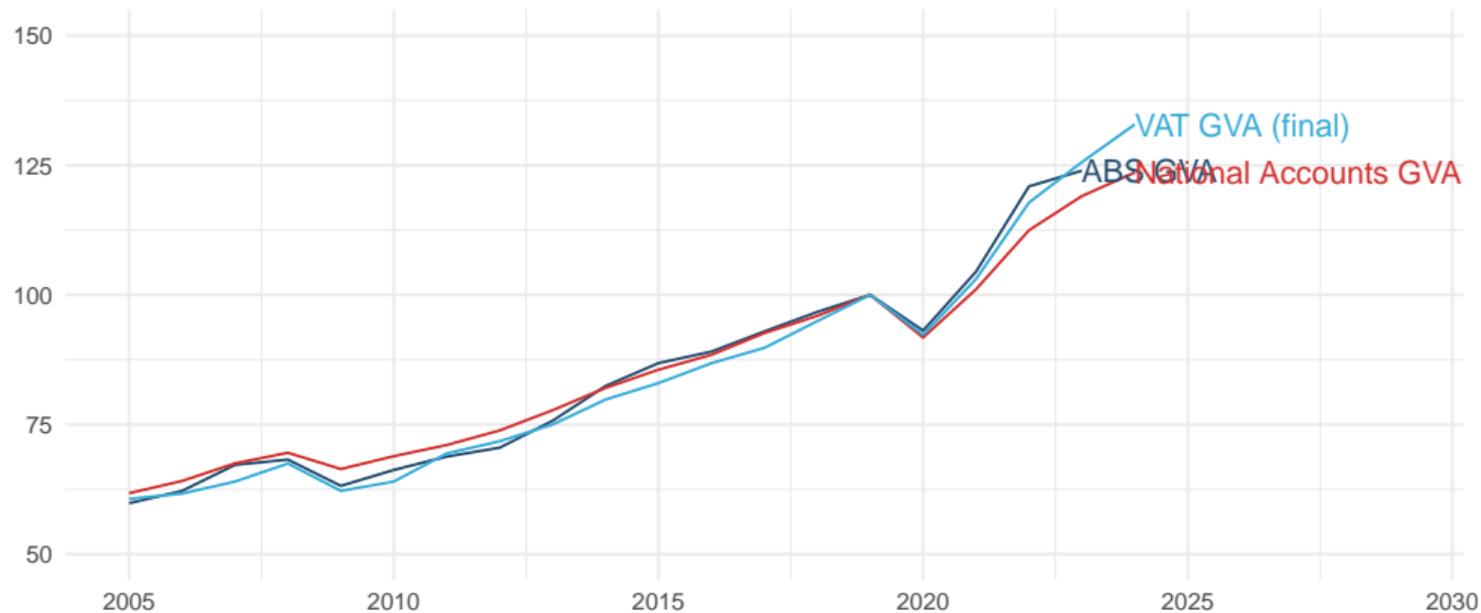
VAT estimates versus existing data

Total GVA (£m, core industries)



VAT estimates versus existing data

Total GVA (2019=100, core industries)



VAT estimates versus existing data

Change:	2005-2010	2011-2019	2019-2023	2023-2024
Monthly turnover	-12.8	27.7	20.0	1.9
ABS turnover	-9.7	27.9	20.7	
ABS IC	-3.4	21.8	20.0	
ABS GVA	-23.7	45.3	23.9	
National Accounts turnover	-17.8	39.6	22.0	
National Accounts IC	-16.1	38.5	24.9	
National Accounts GVA	-19.5	40.8	19.1	3.8
VAT turnover (final)	-16.9	36.4	21.1	3.9
VAT IC (final)	-14.4	33.3	19.2	3.1
VAT GVA (final)	-22.9	44.0	25.6	5.8

VAT estimates versus existing data

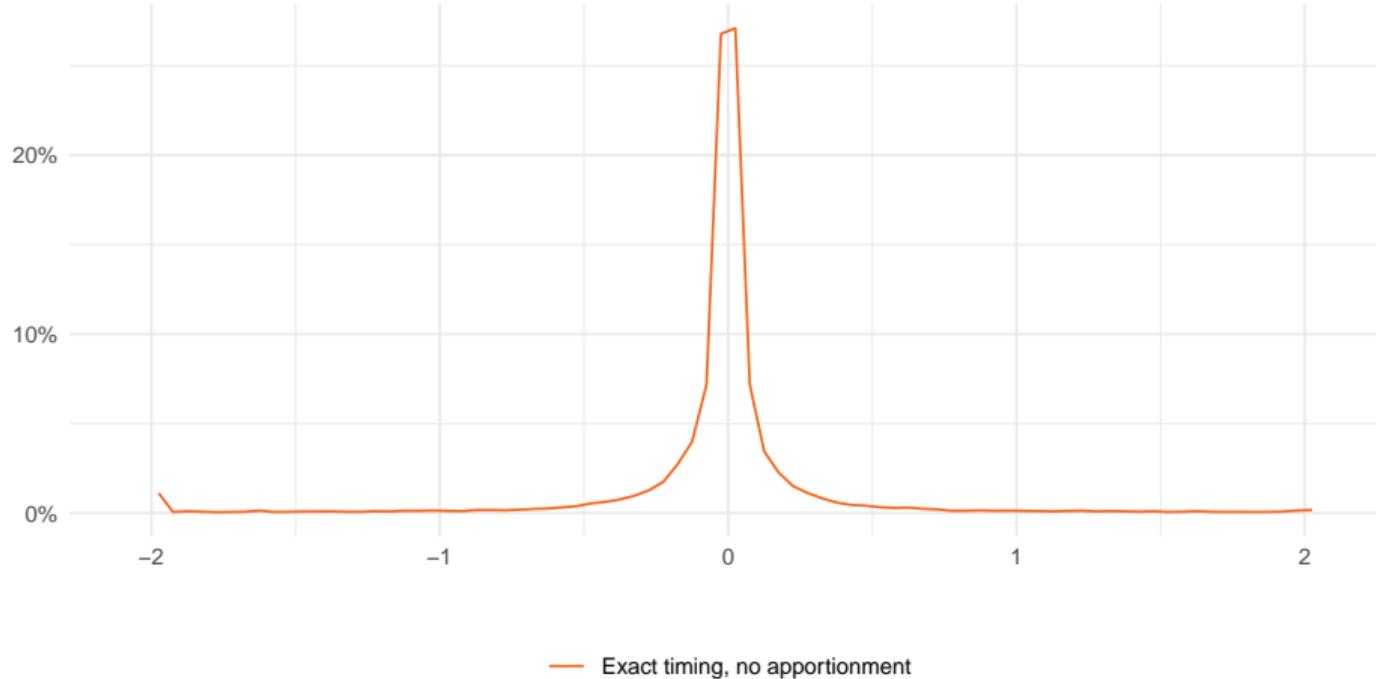
- Many elements of consistency
- (And areas around oil and energy that are likely causing the greatest differences)
- VAT-based GVA estimates have too-high IC and structurally lower GVA (by about 10%) – this *is* the direction firms are incentivised to go in
- Nonetheless VAT-based GVA estimates match ABS growth rates more reasonably, and there will be many other factors informing national accounts apart from output measures
- Interestingly high-growth for VAT estimates for 2024, more scrutiny of the VAT estimates needed. Similarly, the VAT-based estimate has a worse GFC and starts the 2010s in a lower place.

Define difference relative to the mean of the two data points, i.e.

$$\text{Proportional difference}_{i,t} = \frac{y_{i,t,ABS} - y_{i,t,VAT}}{0.5 * (y_{i,t,ABS} + y_{i,t,VAT})}$$

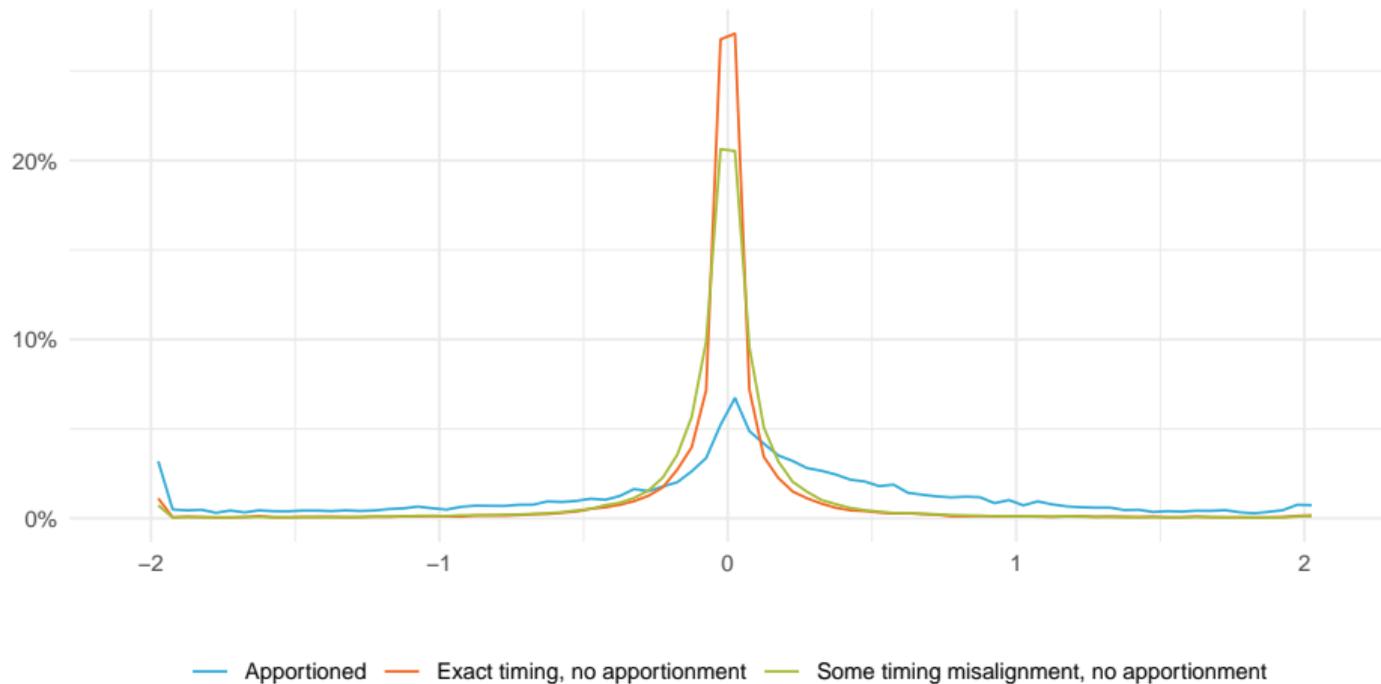
(Difference statistic bounded and symmetric, although it exaggerates if we have negative numbers. Log difference cannot deal with negatives, and for large numbers logs approximate the absolute value less.)

Turnover disagreement, 10-49 worker firms



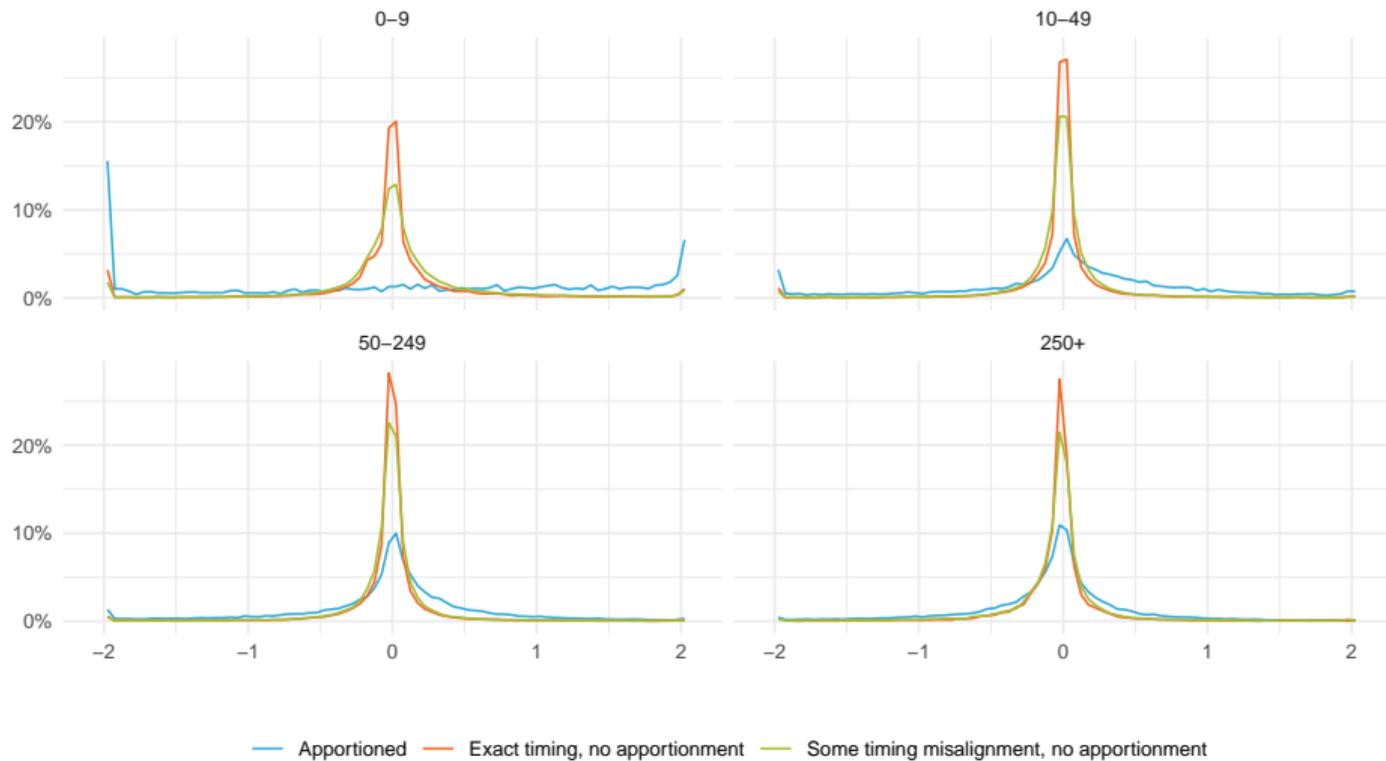
ABS higher = positive. 53% of observations are within 5%, 68% are within 10%, and this is symmetric – 34% where VAT is 10% higher than the mean, 34% where ABS is higher than the mean.

Turnover disagreement, 10-49 worker firms

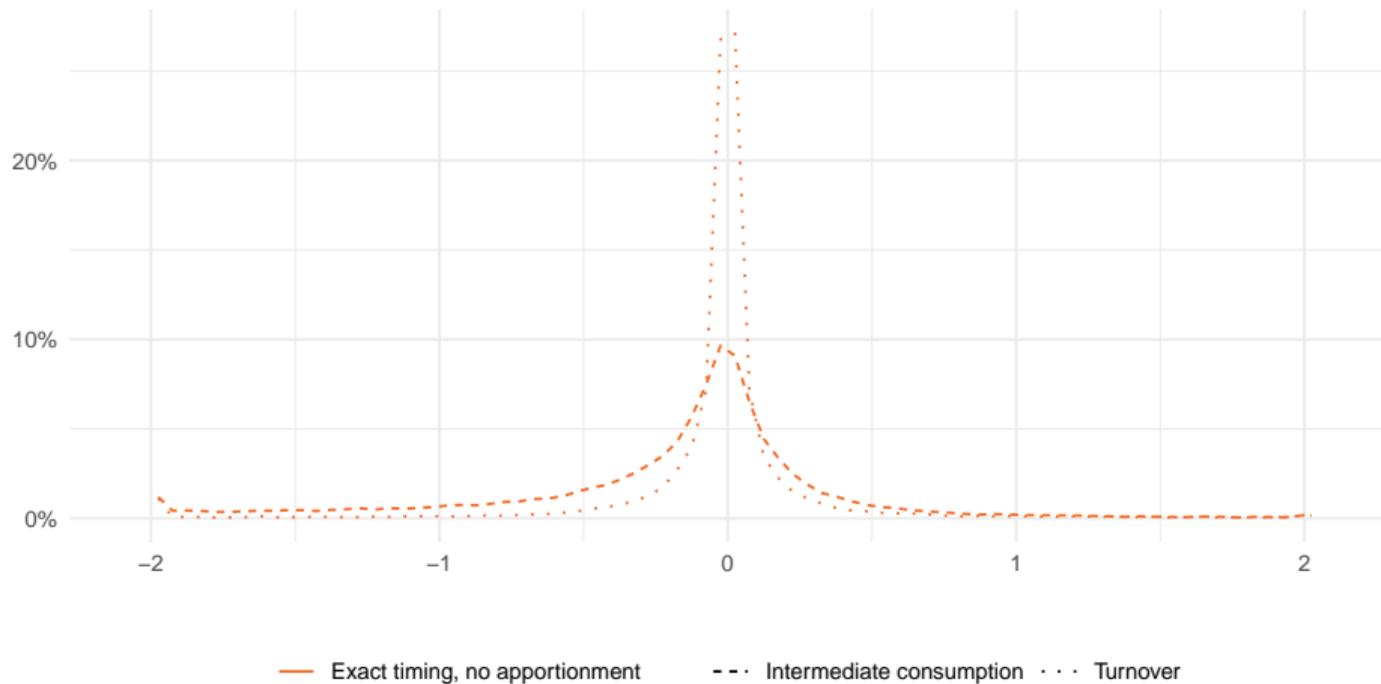


Firm-level consistency

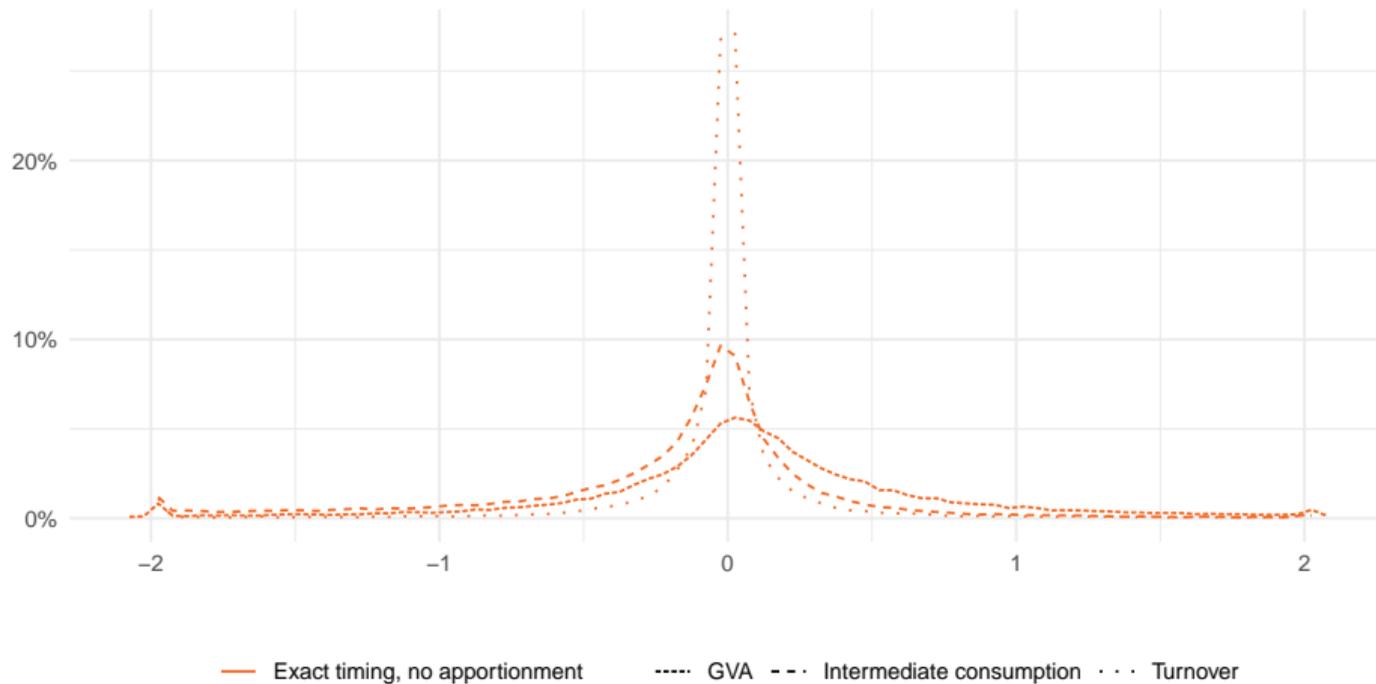
Turnover disagreement, all (n=719,000)



Intermediate consumption disagreement, 10-49

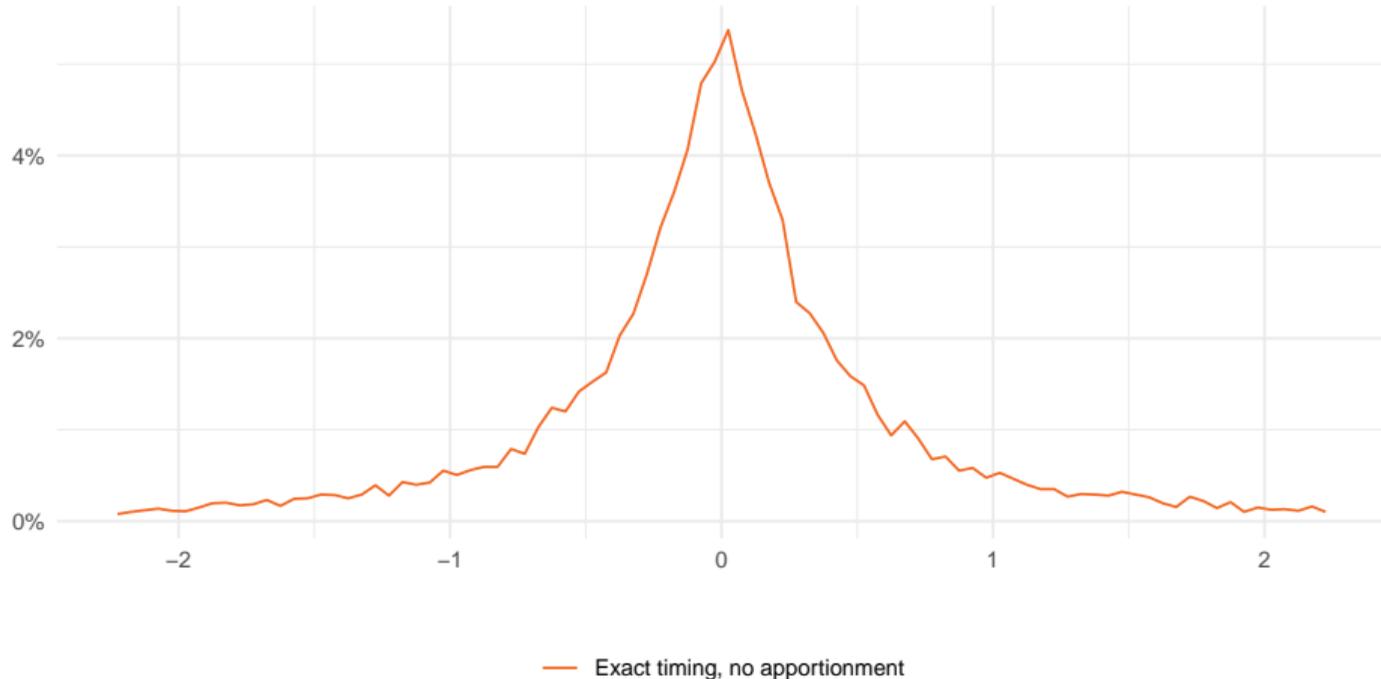


GVA disagreement, 10-49



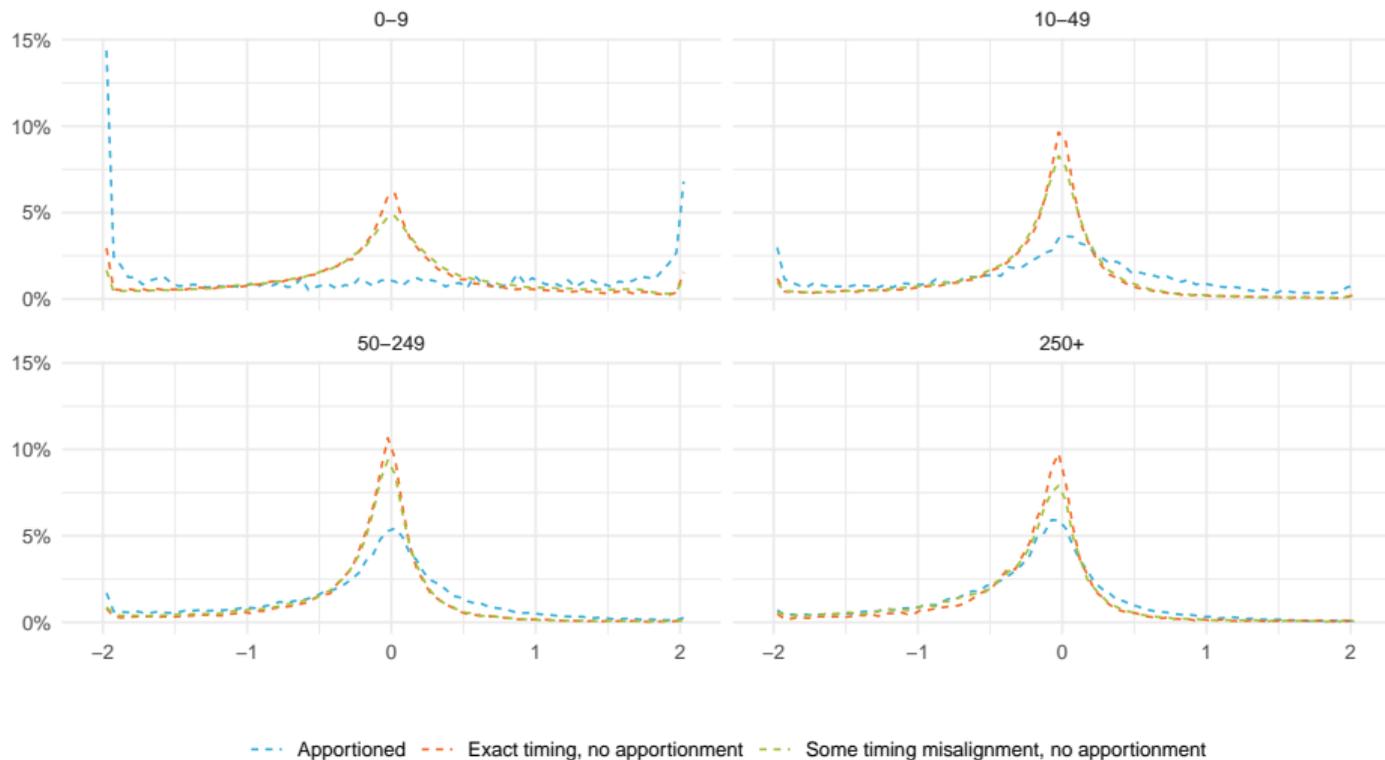
Firm-level consistency

Annual GVA growth disagreement, 10-49 (i.e. the difference between a growth rate of 10% and 5% would be $67\% = 5\% / 7.5\%$)

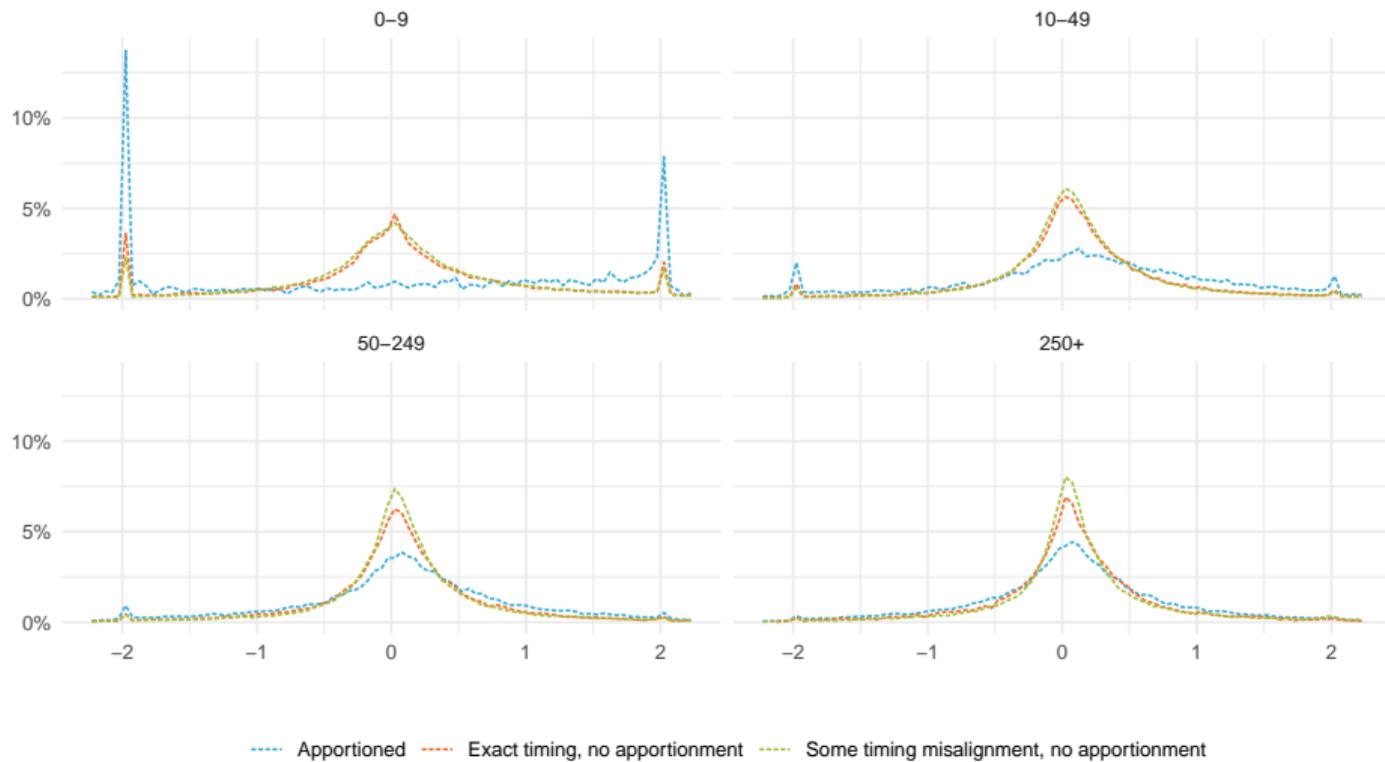


Firm-level consistency

Intermediate consumption disagreement, all

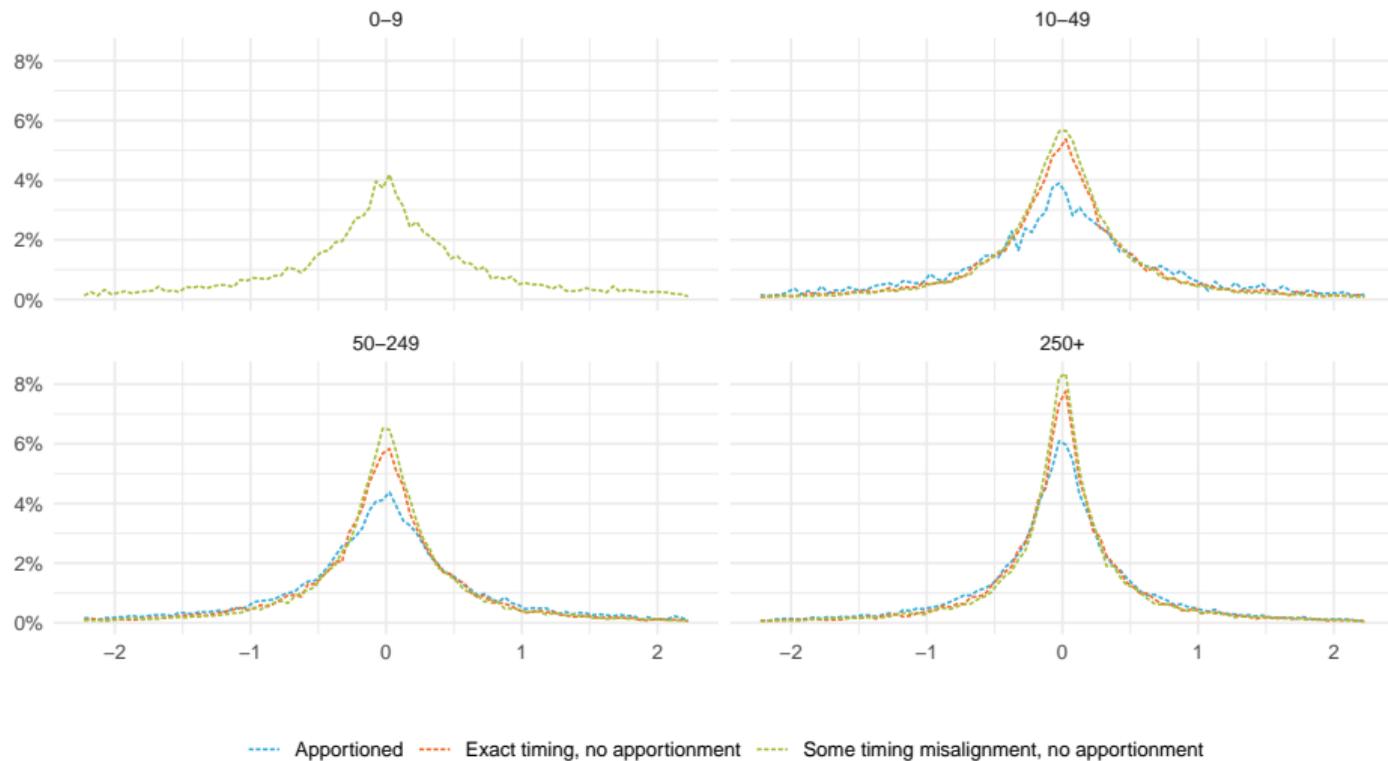


GVA disagreement, all



Firm-level consistency

Annual GVA growth disagreement, all



VAT-ABS annual GVA growth disagreement	
less than minus 50%	17.0%
minus 50% to 20%	13.4%
minus 20% to 10%	8.4%
minus 10% to 0%	11.3%
plus 0% to 10%	11.4%
plus 10% to 20%	8.3%
plus 20% to 50%	13.4%
plus 50 or more%	16.8%

(ABS higher = positive, total number of enterprise-years eligible for the comparison is 230,468)

Firm-level consistency

Annual GVA growth level agreement, agreement within 20%



- Wideness and often lack of bias to the distribution of differences, factors such as timing and estimating the smoothing of inventory may be neutral
- Small fall in consistency in the 2020s

Aggregate Productivity decompositions

Everything deflated into 2023 prices

Because we are tracking firms over time, there is no chain volume measure (i.e. no changing weights in the output index based on contemporary nominal importance). This means that some of the faster-growing sectors have less weight and the total will add up to lower real-terms productivity growth than in the official statistics.

Aggregate Productivity decompositions



Aggregate productivity decompositions

Decomposition formula, for example, from Diewert & Fox, 2010:

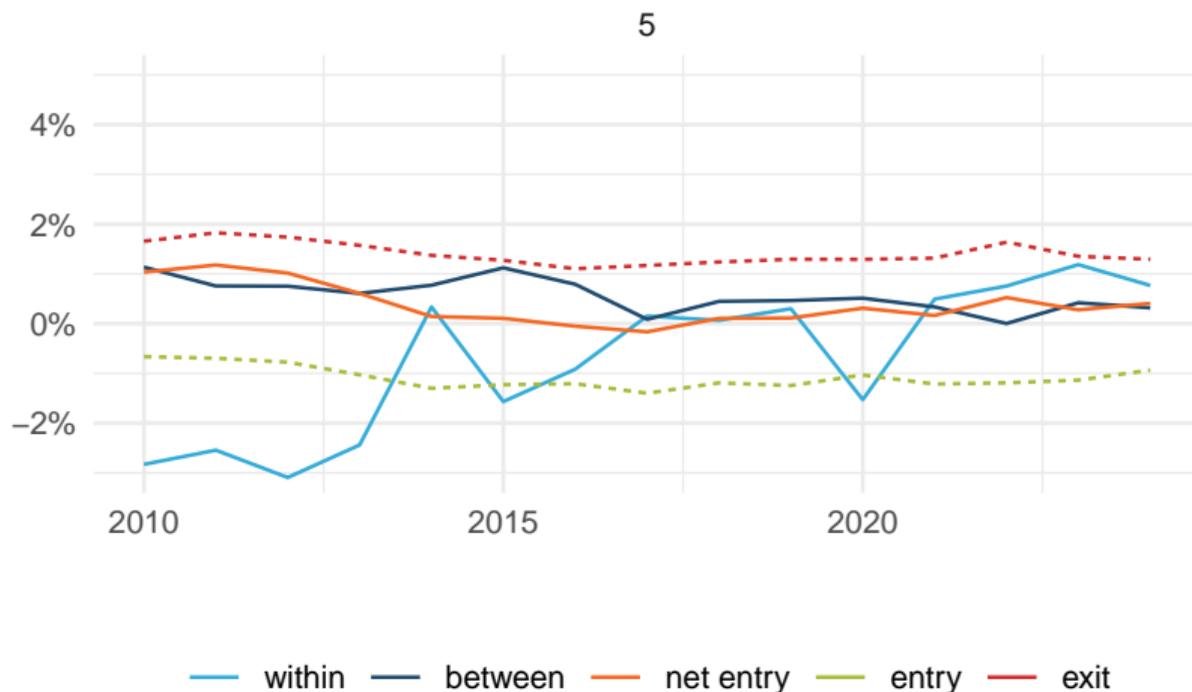
$$\Delta \Pi_t = \underbrace{\sum_{i \in C} s_{C,i,t-k} \Delta \pi_{i,t}}_{\text{continuers within}} + \underbrace{\sum_{i \in C} \Delta s_{C,i,t} (\pi_{i,t-k} - \bar{\Pi}_C)}_{\text{continuers between}} + \underbrace{\sum_{i \in E} s_{i,t} (\pi_{i,t} - \Pi_{C,t})}_{\text{entrants}} - \underbrace{\sum_{i \in X} s_{i,t-k} (\pi_{i,t-k} - \Pi_{C,t-k})}_{\text{exiters}}$$

Where k is the interval, Π is aggregate labour productivity, π firm-level labour productivity, s share of workers, s_C is the share of workers in continuing firms, and $\Pi_C = \sum s_{C,i} \pi_i$ the aggregate productivity of continuers.

Entrants and exiters are assessed on a contemporaneous basis, rather than versus the average productivity across the two ends of the period.

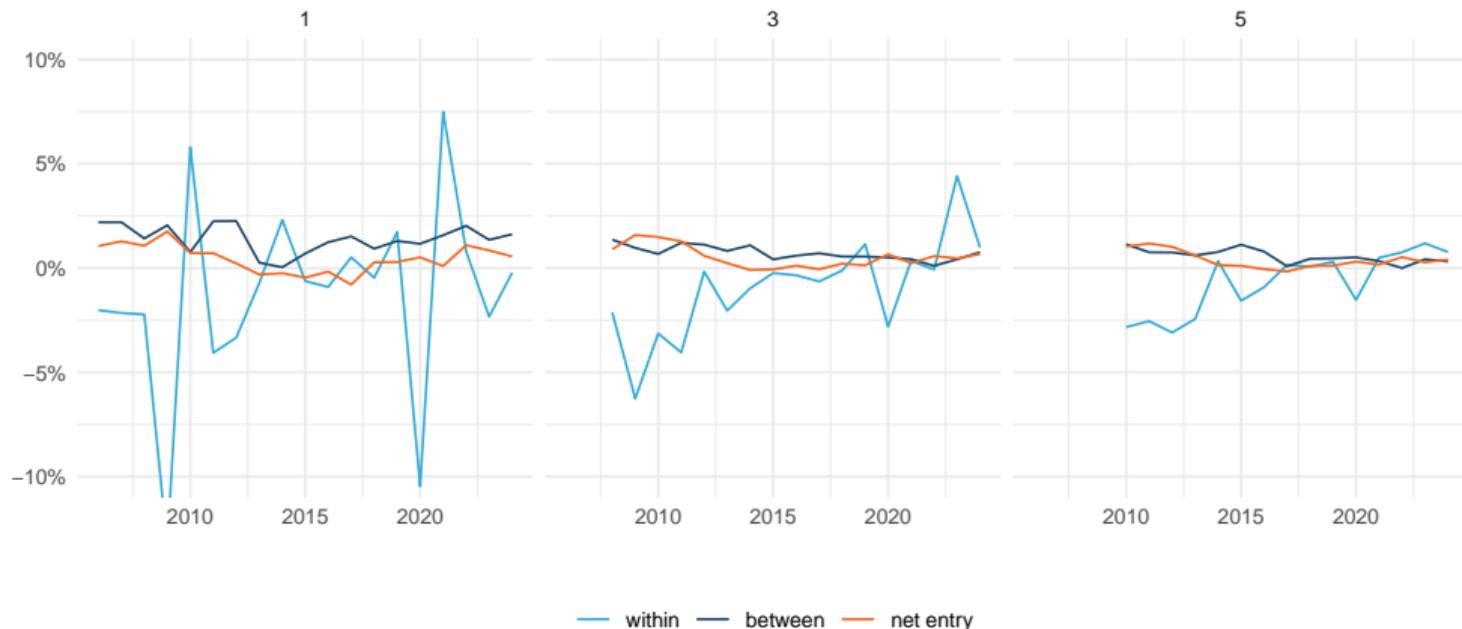
Aggregate Productivity decompositions

Percentage point contributions to output per job for 5-year interval to date, annualised, core industries.



Aggregate Productivity decompositions

Percentage point contributions to output per job for different time intervals to date, annualised, core industries.



Aggregate Productivity decompositions

Percentage point contributions to output per job, 5-year intervals, core industries

period	within	between	net entry	entry	exit
2005-2010	-2.83	1.14	1.04	-0.66	1.66
2006-2011	-2.55	0.76	1.18	-0.70	1.83
2007-2012	-3.10	0.75	1.02	-0.78	1.74
2011-2019 average	-0.10	0.45	0.00	-1.26	1.20
2018-2023	1.19	0.42	0.28	-1.14	1.35
2019-2024	0.77	0.32	0.41	-0.94	1.29

Aggregate Productivity decompositions

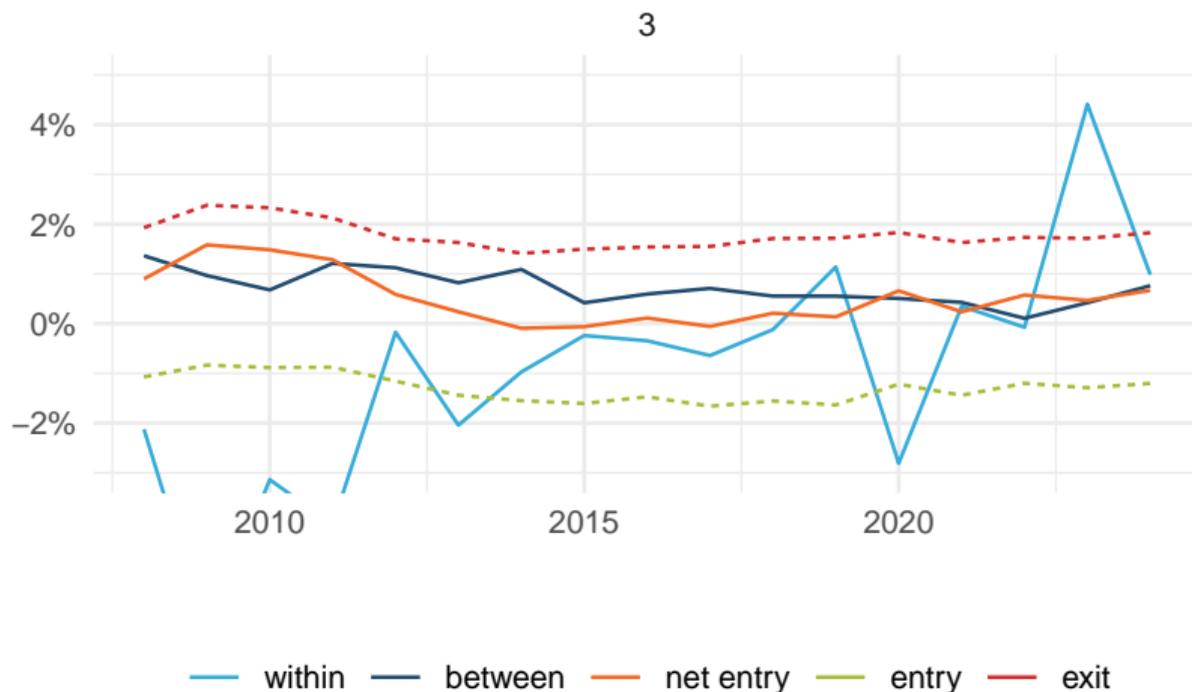
Recession cleansing or trend fall in dynamism?

The current set of VAT data starts in 2005, there is a limited amount that can be said for if productivity growth through dynamism falls into 2008 or rises.

If economic growth crises are higher intensity in the UK in the 2020s than the 2010s, this may have impacted the contribution from exit, but not reallocation among continuers.

Aggregate Productivity decompositions

Percentage point contributions to output per job for 3-year interval to date, annualised, core industries.

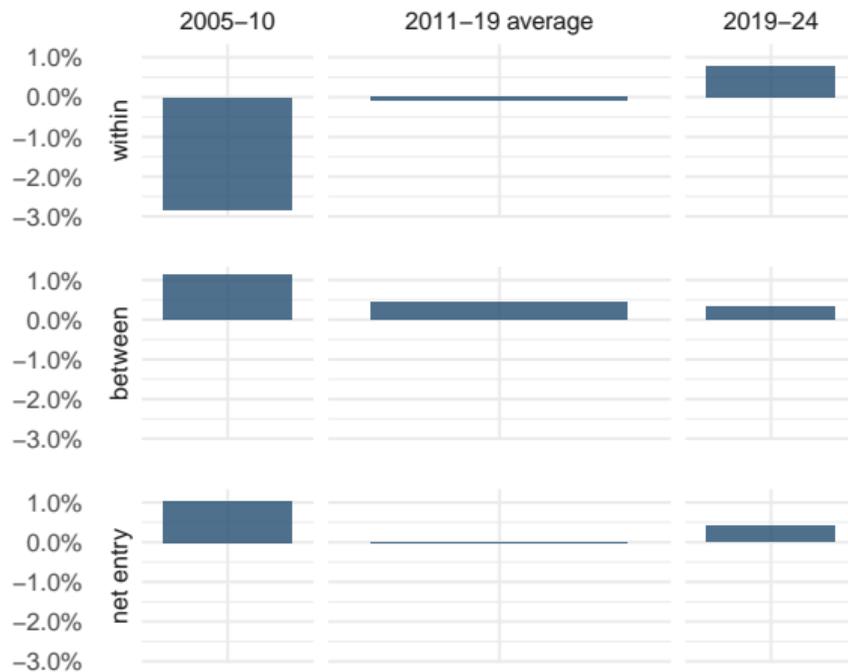


Aggregate Productivity decompositions

Robustness – other decomposition formulae, other data processing choices

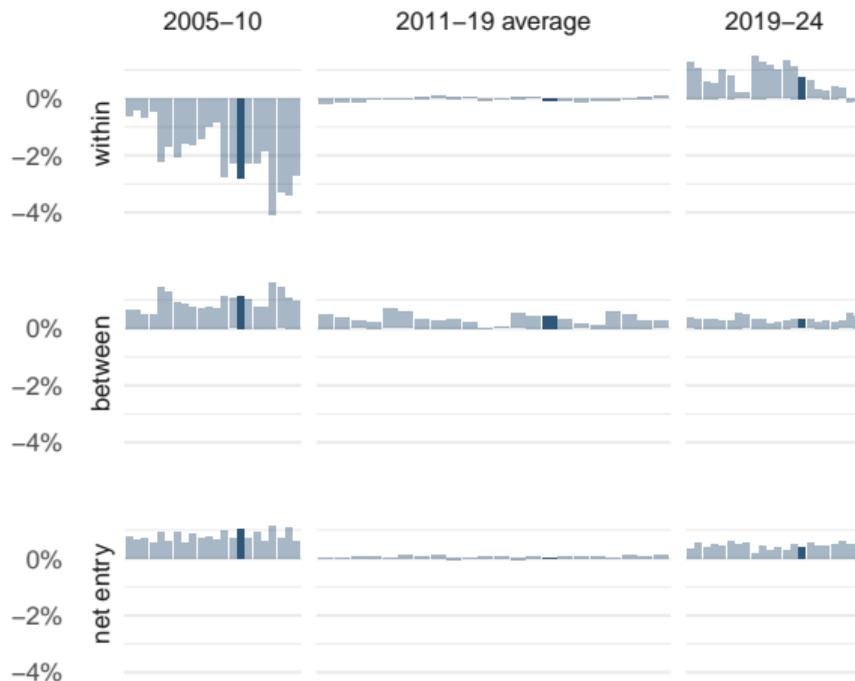
Aggregate Productivity decompositions

5-year interval contributions, core industries



Aggregate Productivity decompositions

5-year interval contributions, core industries



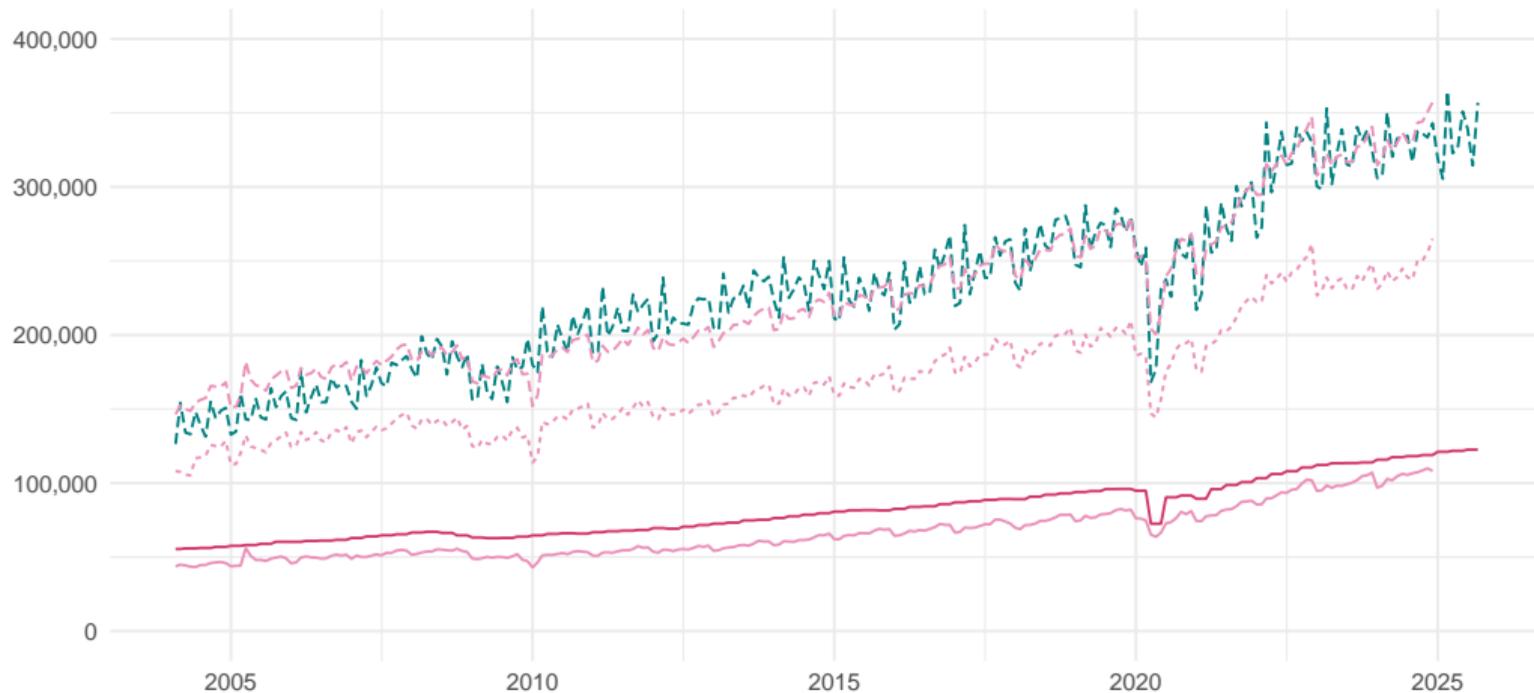
The consistency of the VAT data should be kept in review. There are issues of timing, conceptual usefulness and biases. Issues around stocks, and treatment of large enterprise groups spanning many industries are also important (issues that are useful to bear in mind more widely?)

Substantial value to keep running the Annual Business Survey and the monthly business surveys (and in fact monthly surveys are faster than VAT).

Aggregate productivity growth in the 2020s is more within-firm, according to the VAT data (and being mindful of the consistency issues with the VAT data). Growth from reallocation of the workforce to more productive firms has gradually slowed since 2010 and there is no evidence the Covid recession led to a 'clearing out'. Net entry contributes slightly more productivity growth in the 2020s, but was low in the 2010s.

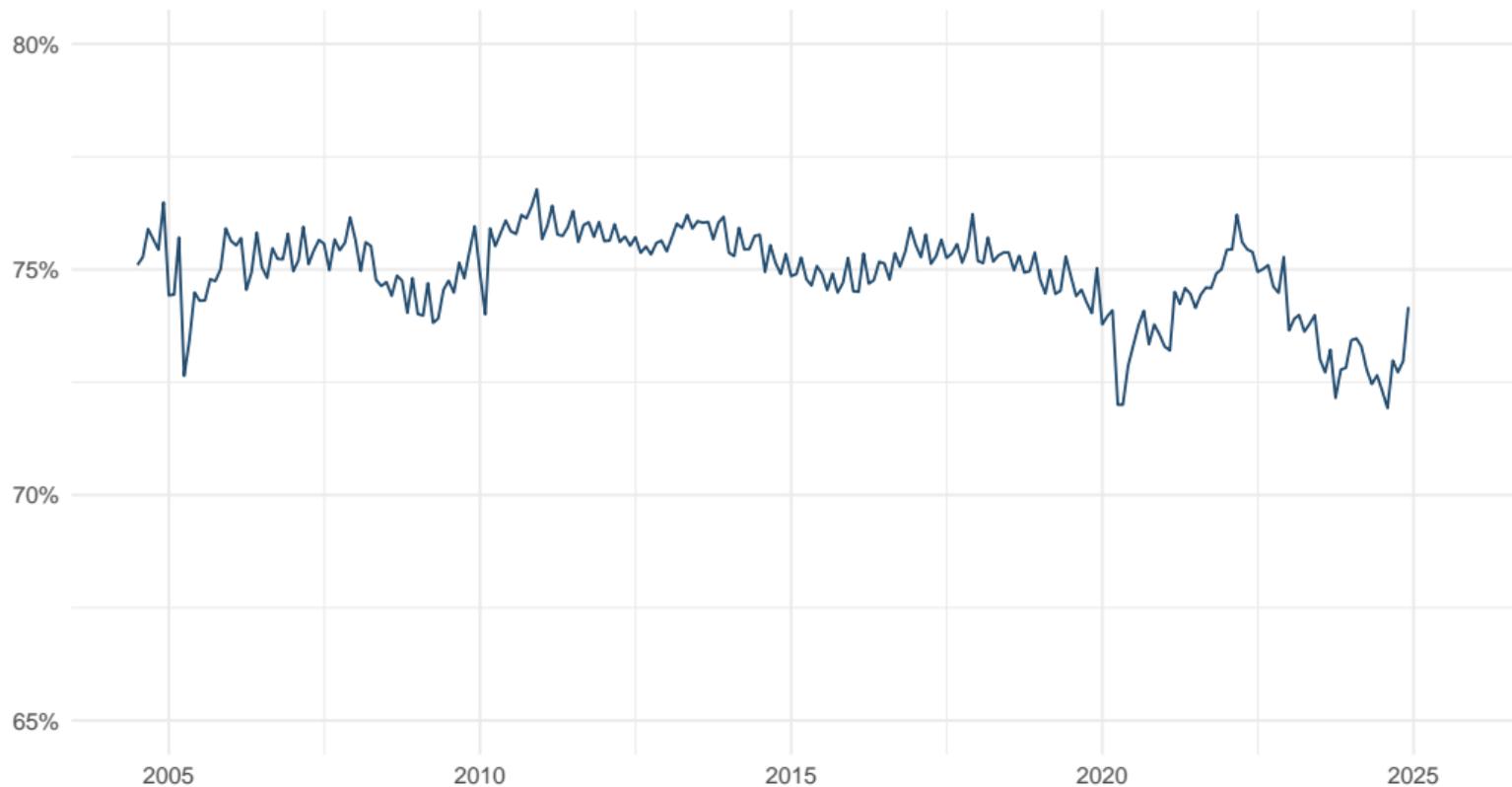
Appendix: high-frequency

Underlying monthly totals from VAT estimates



— Monthly surveys — National Accounts quarterly/3 — VAT — GVA ··· IC - - - turnover

Monthly ratio of IC to turnover from VAT estimates

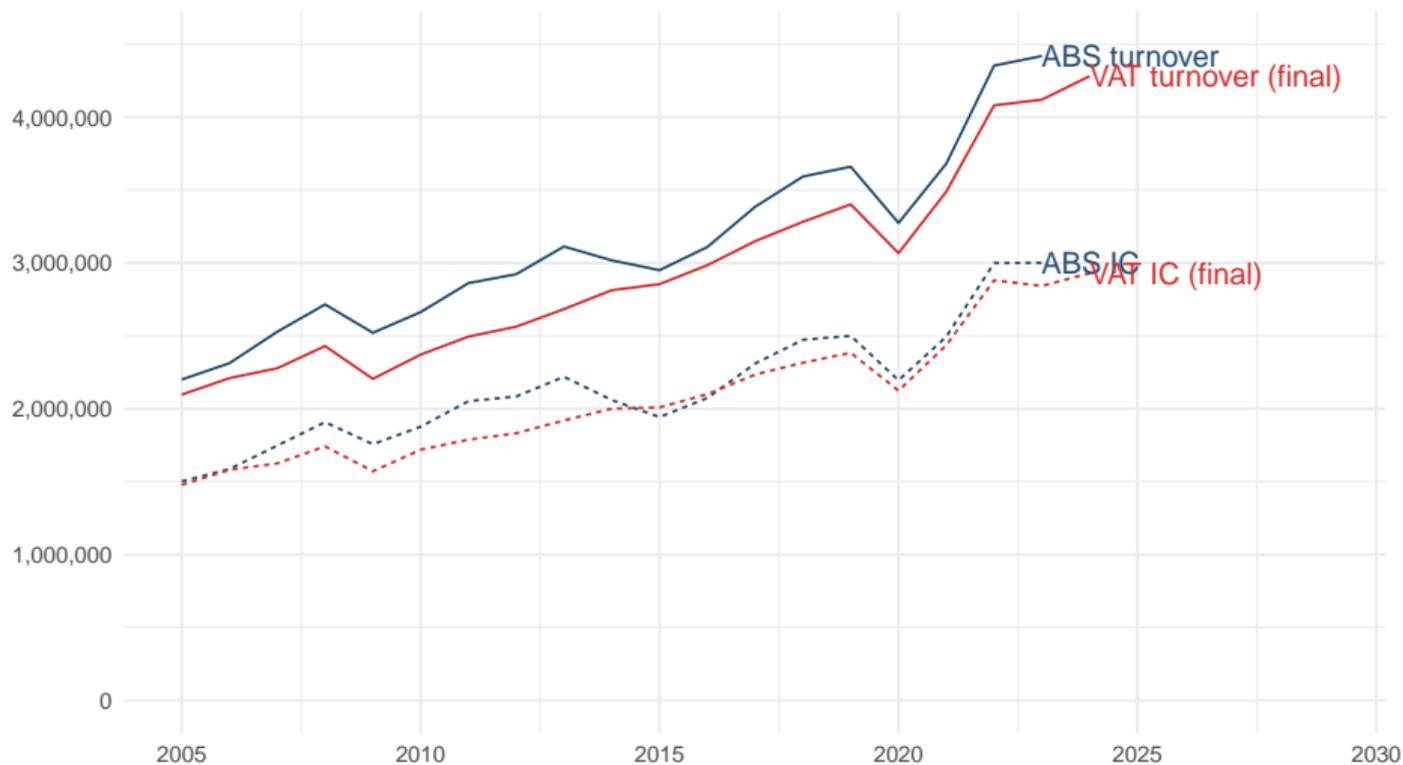


Appendix: oil



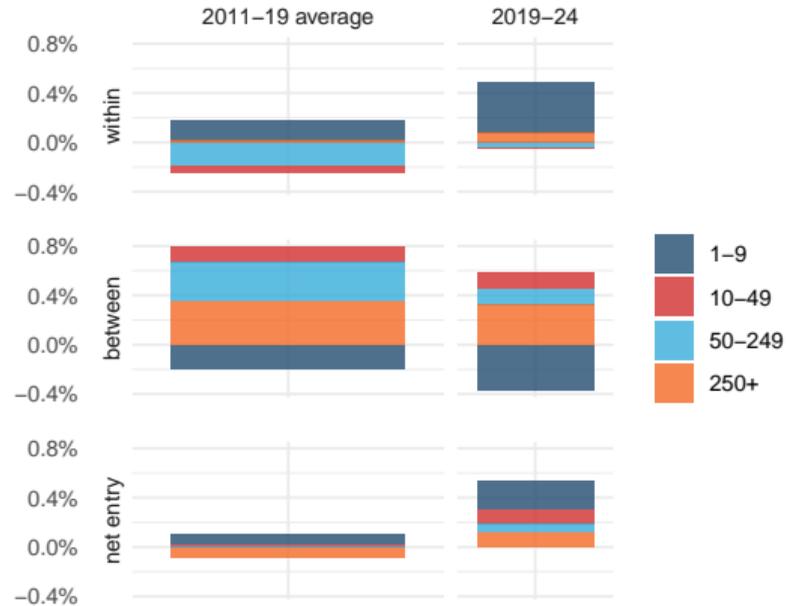
Appendix: aggregates consistency

Total turnover and intermediate consumption (£m, core industries)



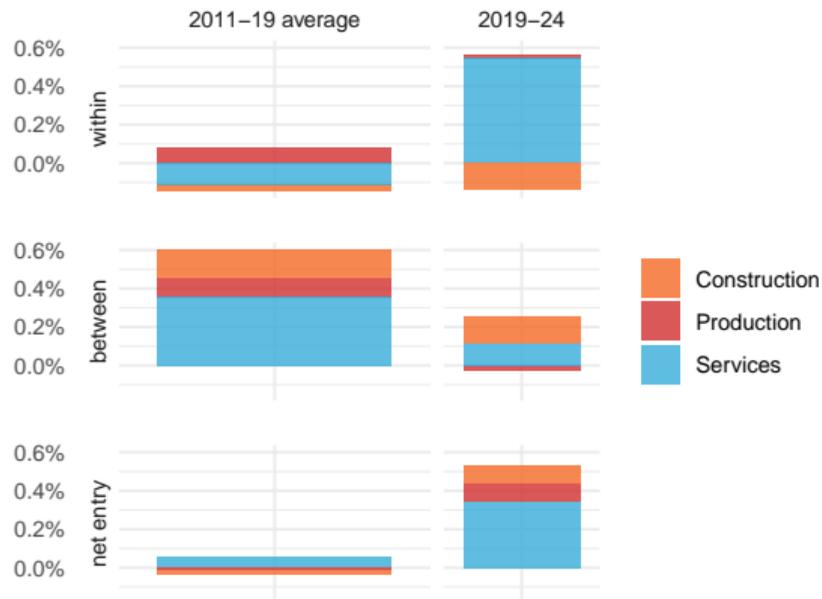
Appendix: aggregate productivity decompositions

5-year interval contributions, core industries, by size



Appendix: aggregate productivity decompositions

5-year interval contributions, core industries, by sector



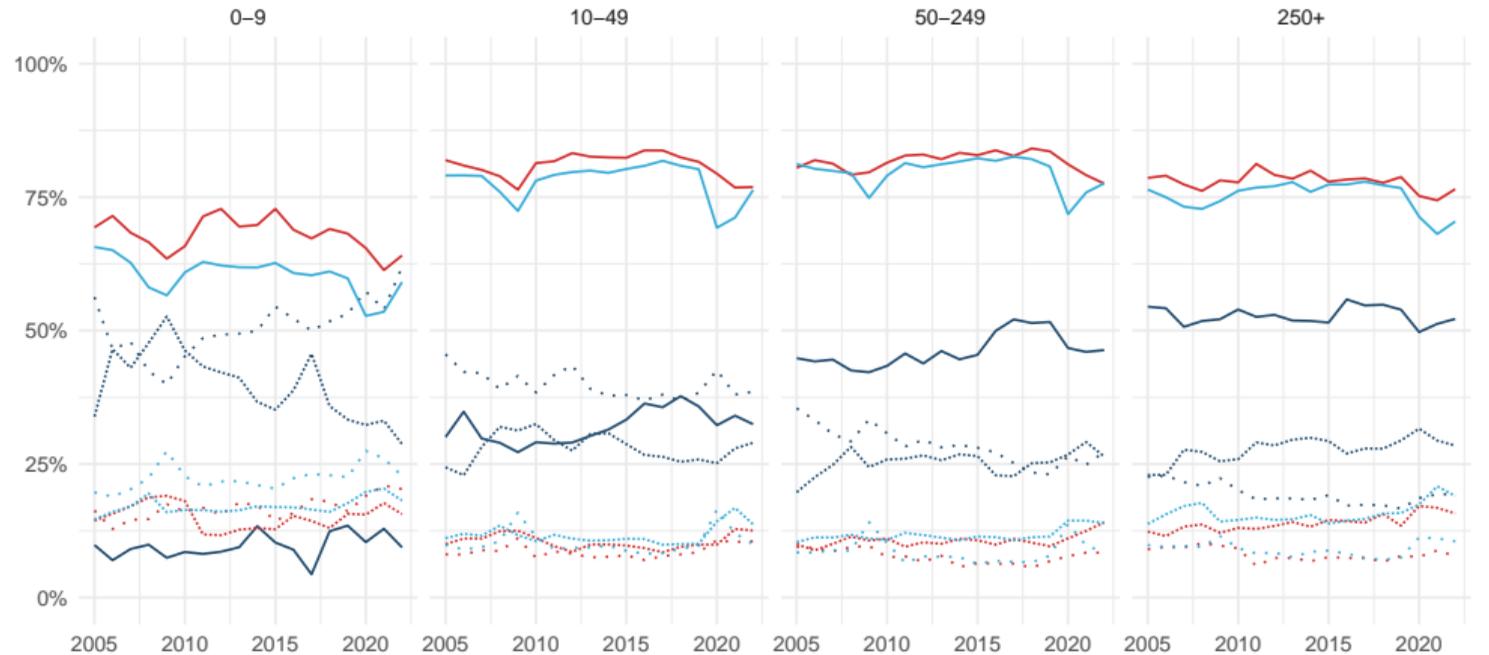
Appendix: aggregate productivity decompositions

5-year interval contributions, core industries, by region



Appendix: Firm-level consistency

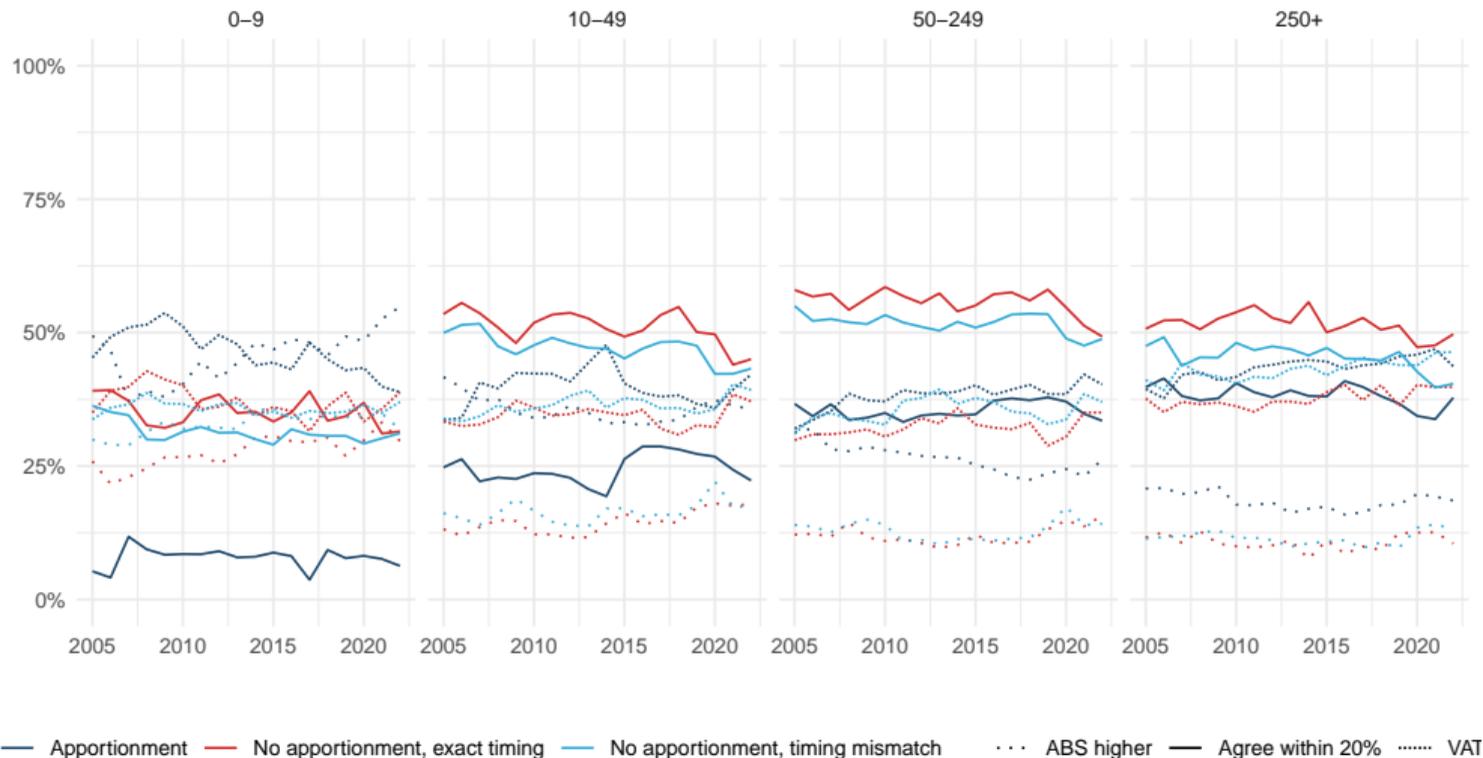
Turnover level agreement



— Apportionment — No apportionment, exact timing — No apportionment, timing mismatch ··· ABS higher — Agree within 20% ····· VAT

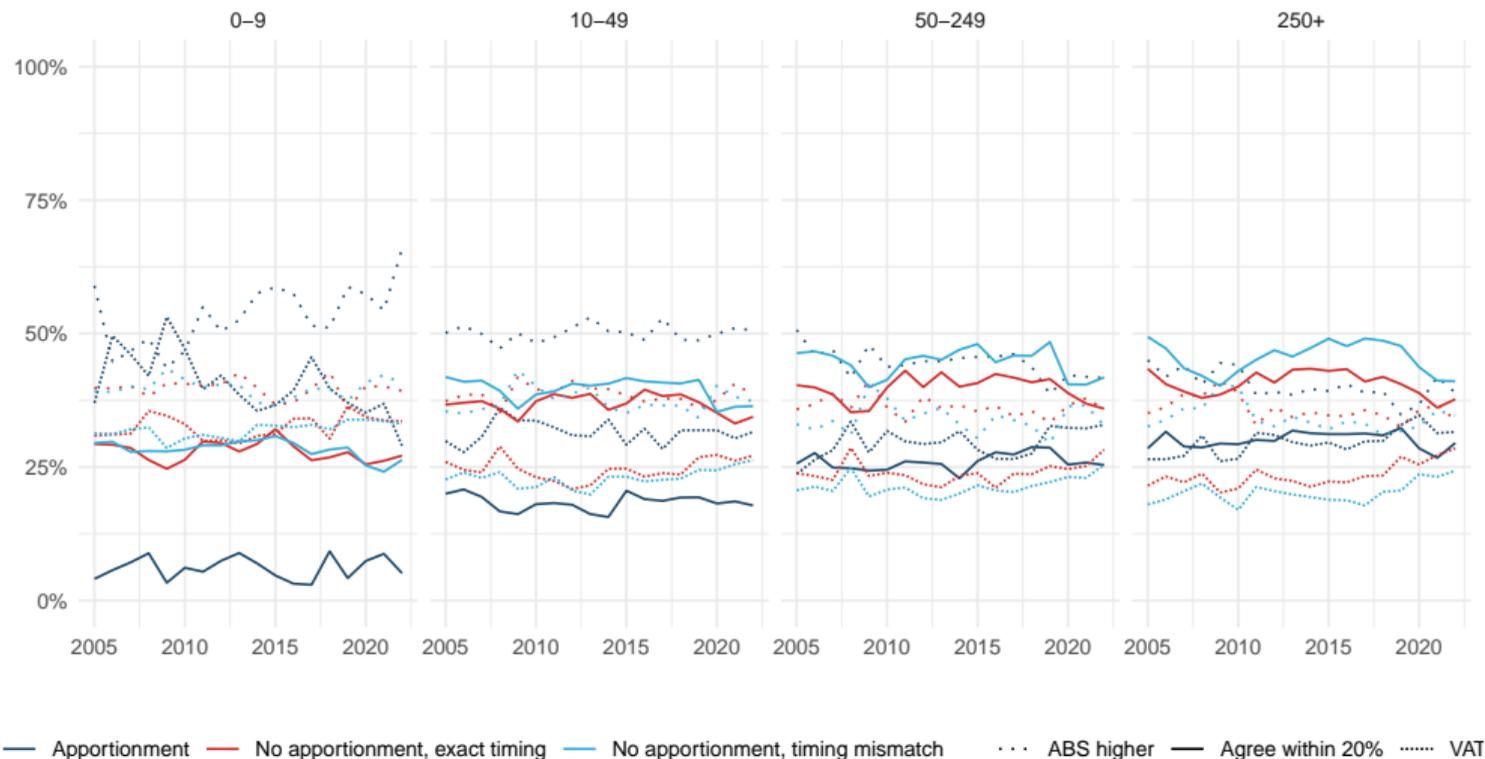
Appendix: Firm-level consistency

IC level agreement



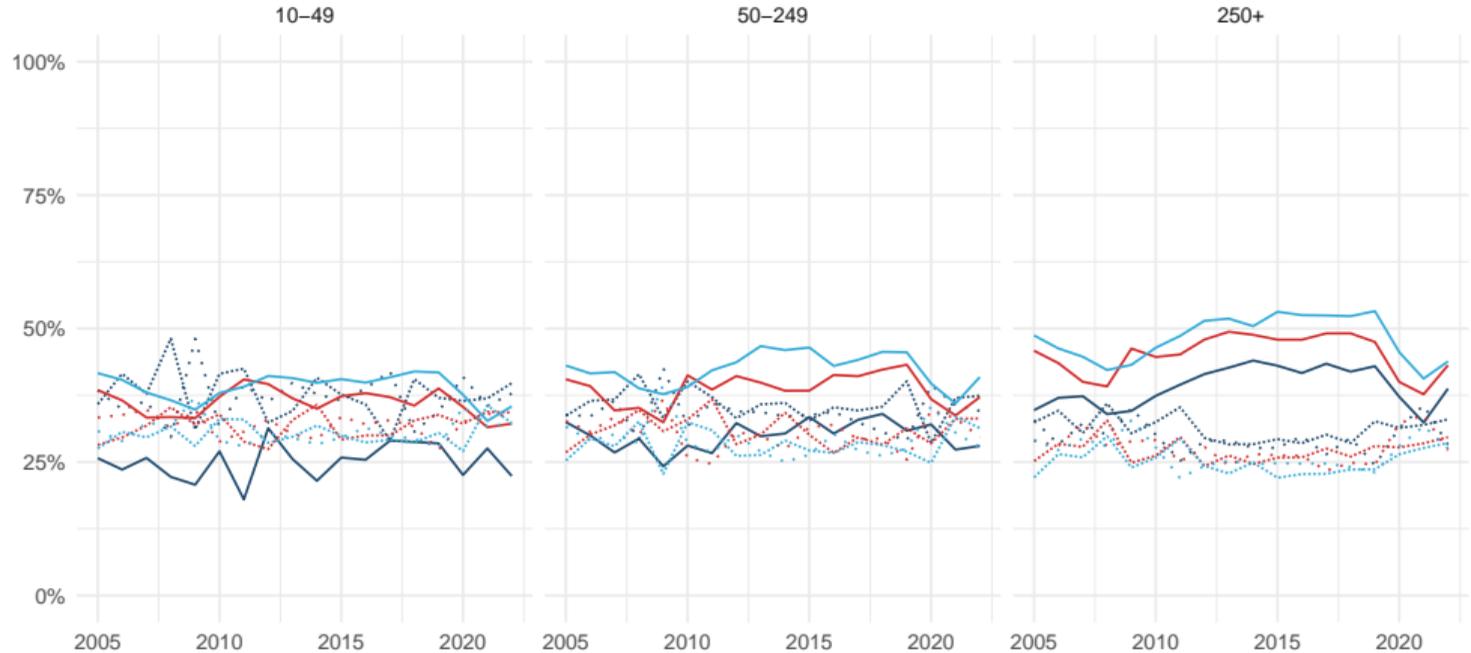
Appendix: Firm-level consistency

GVA level agreement



Appendix: Firm-level consistency

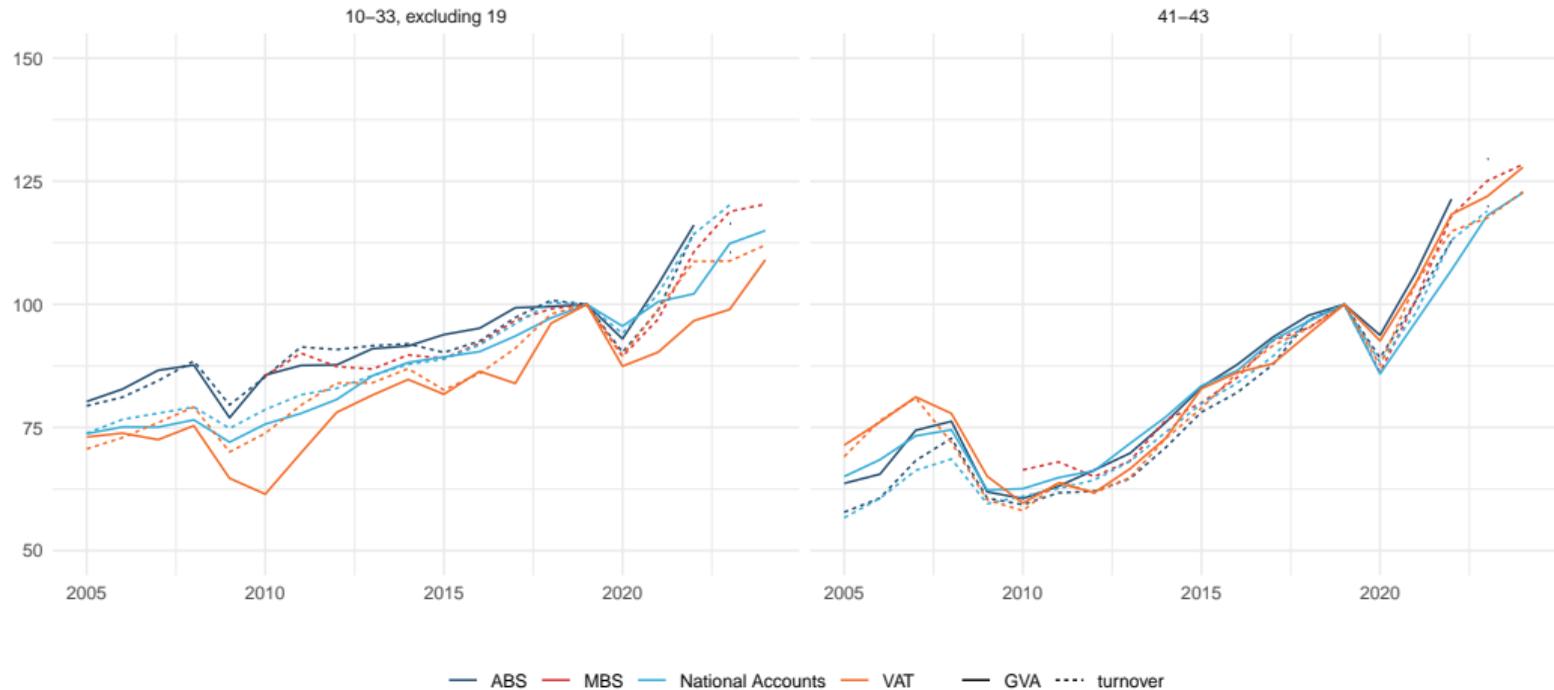
Annual GVA growth level agreement



— Apportionment — No apportionment, exact timing — No apportionment, timing mismatch ··· ABS higher — Agree within 20% ··· VAT

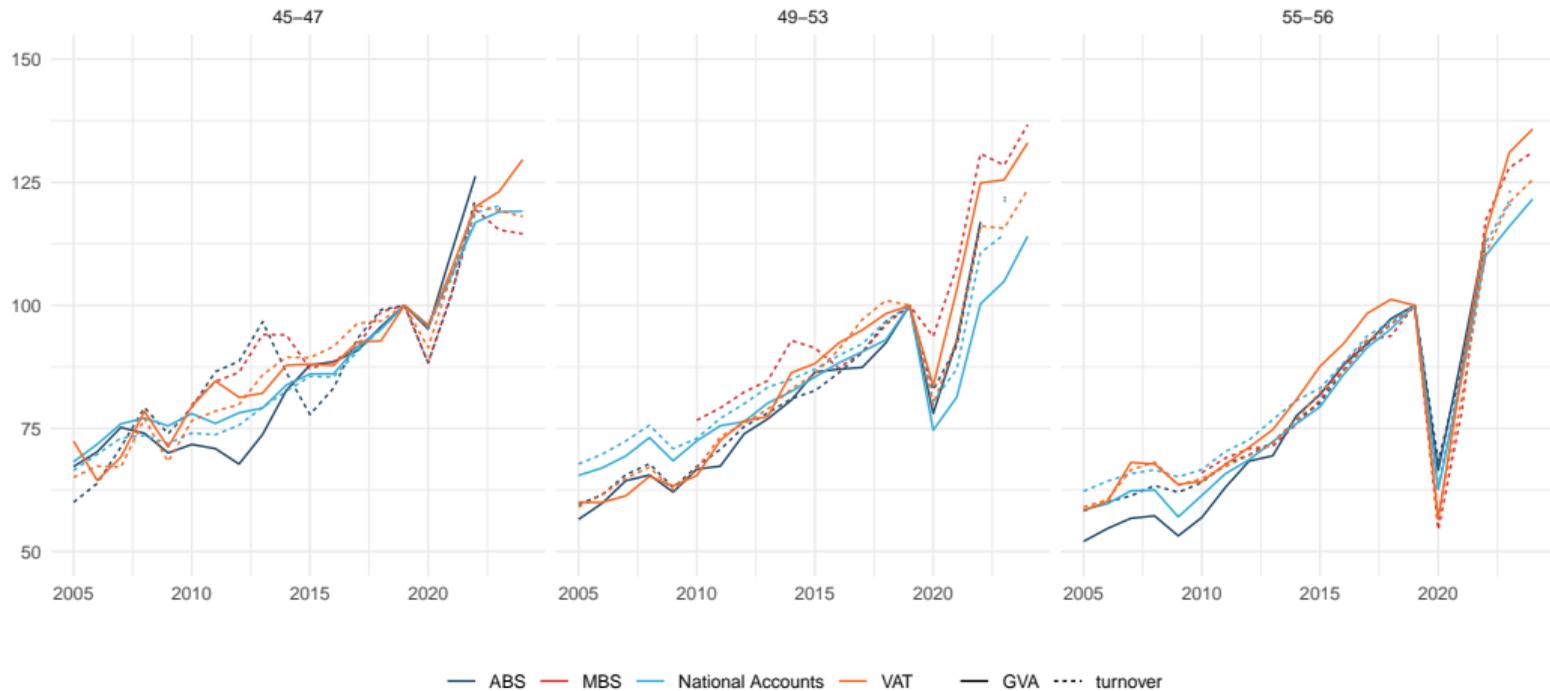
Appendix: aggregates consistency by industry

2019=100



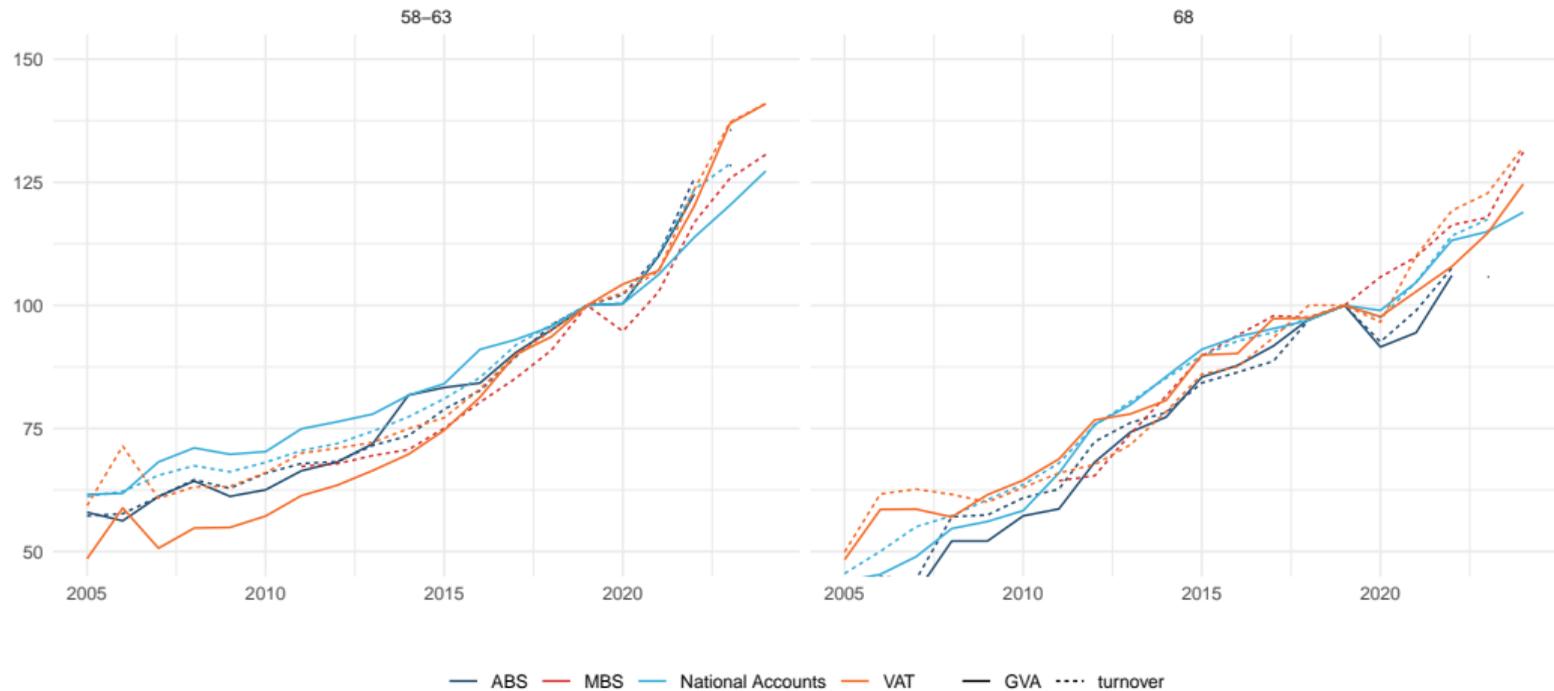
Appendix: aggregates consistency by industry

2019=100



Appendix: aggregates consistency by industry

2019=100



Appendix: aggregates consistency by industry

2019=100

