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Modelling Recent Developments in Corporation Tax

Presentation to the Institute for International and European Affairs

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Structure of Presentation



1. Background
 - micro data
 - timing
 - Irish receipts in context
2. Forecasting and modelling corporation tax
 - recent performance
 - forecasting approach
 - sources of error
 - modelling
3. Main findings

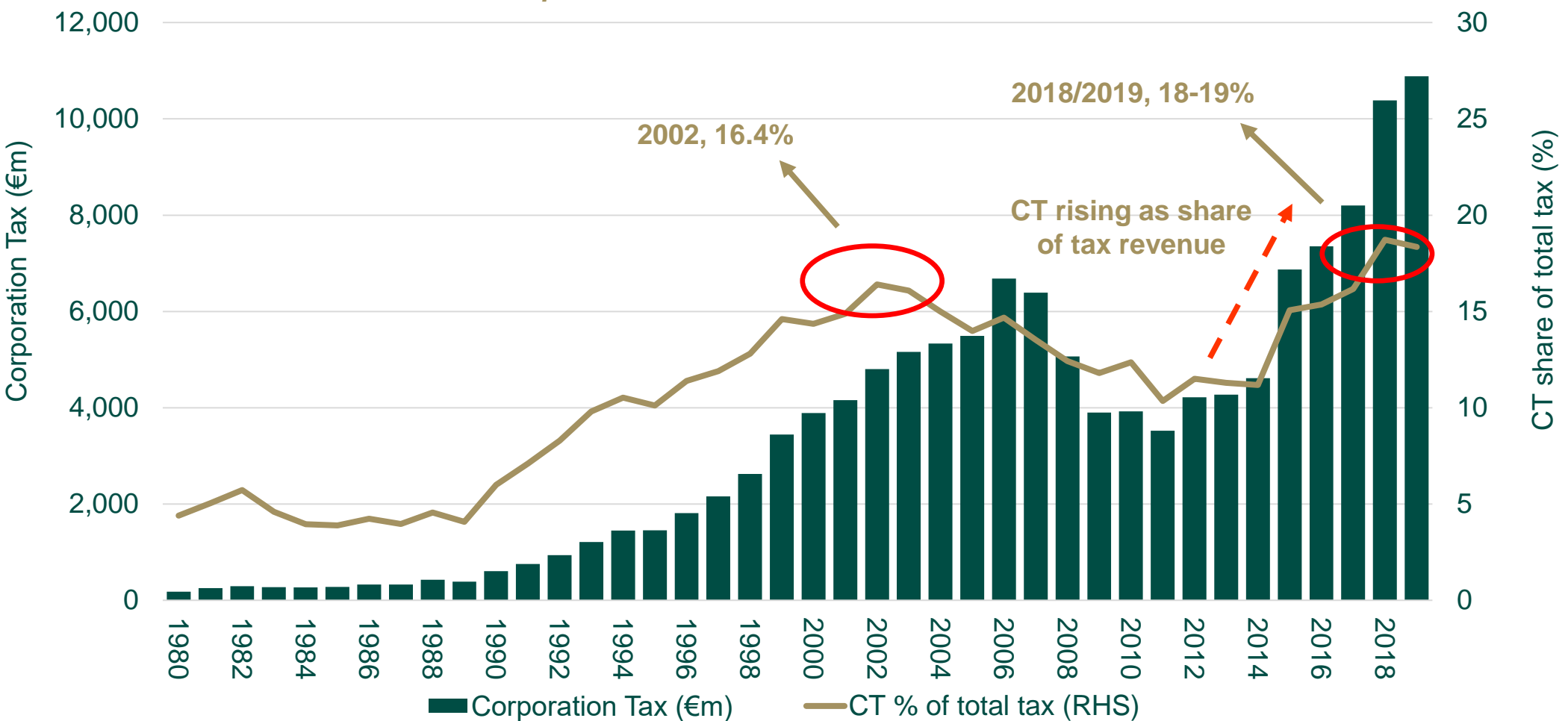
Paper 'Modelling Recent Developments in Corporation Tax' available here:

<https://www.gov.ie/en/publication/29cb12-modelling-recent-developments-in-corporation-tax/>

Background - corporation tax



2019: CT receipts amounted to €10,888m – an increase of 4.8% on 2018





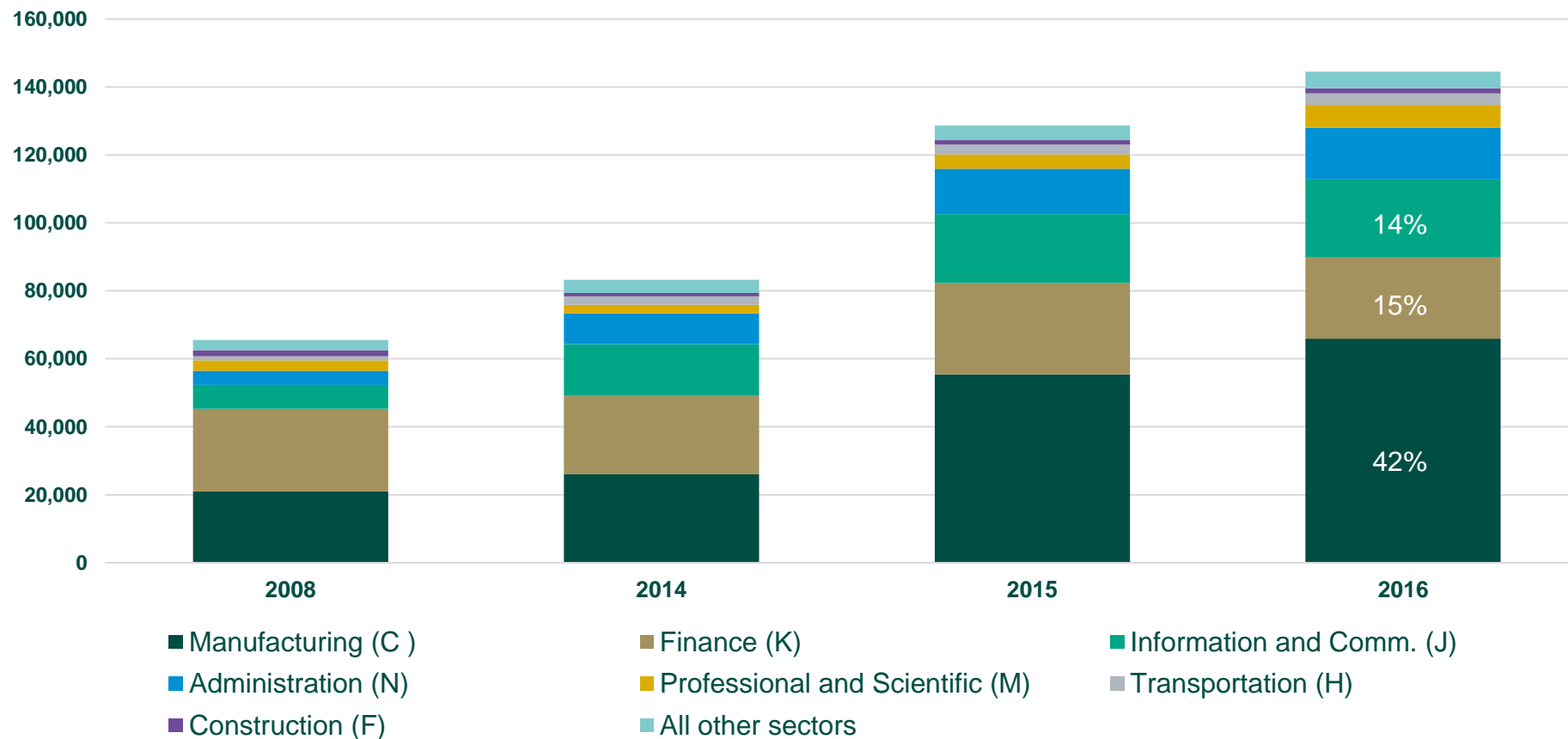
Background - what we know so far

- Corporation tax (CT) receipts experienced a **significant rise** in recent years
- Recent rises driven by increased **profitability** in pharma, tech and finance sectors
- CT receipts are **highly concentrated**
- CT is highly influenced by the **global economy**



Background - micro data & profitability

Corporate profitability, € million

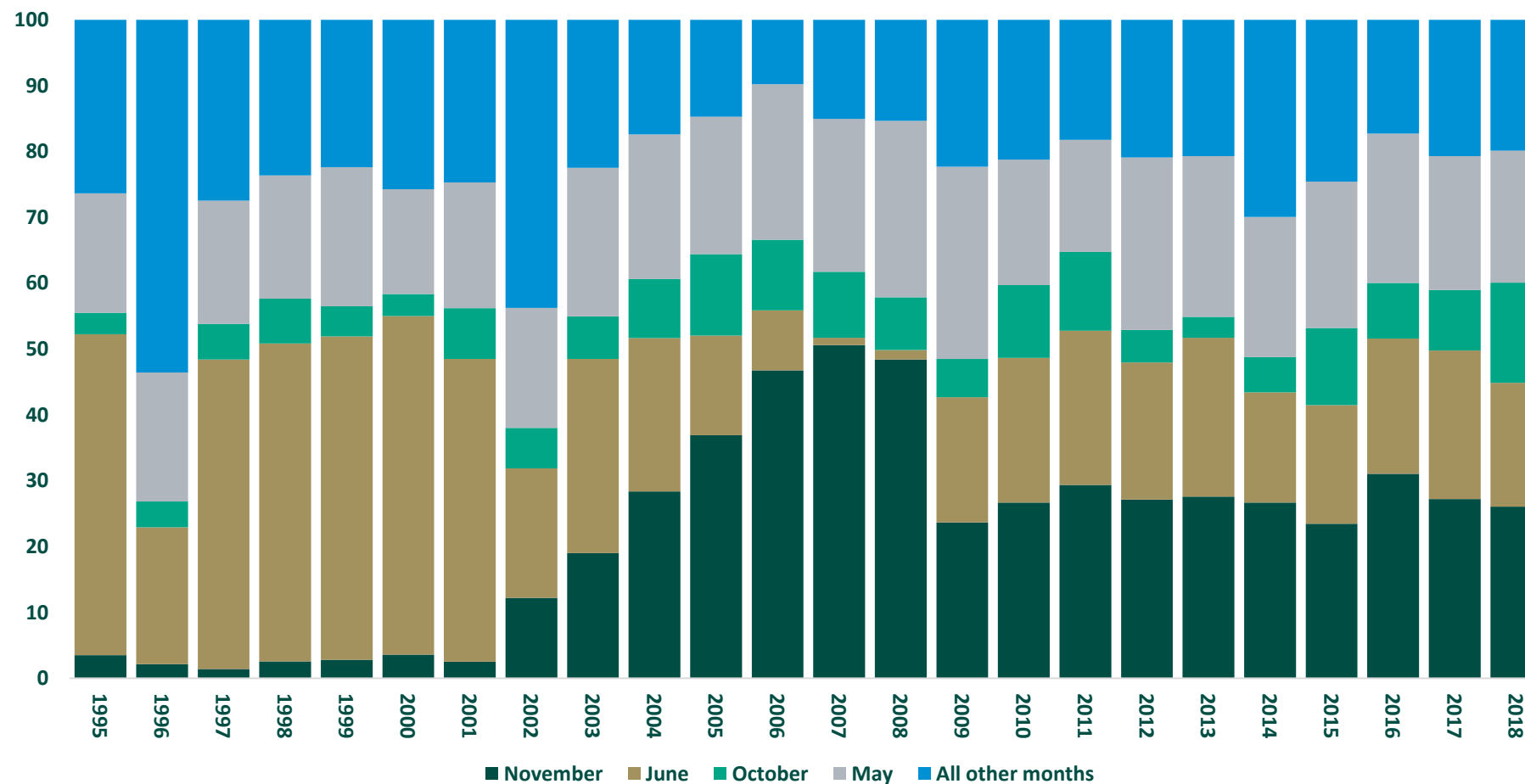


Source: Revenue Data



Background - timing of receipts

Monthly corporation tax receipts as a share of annual receipts, per cent





Background - the role of multinationals

Corporation tax liability, income tax and company employments in 2017

	Number of company returns	CT liable € millions	No. Employees	Income tax, USC & PRSI € million
All companies	164,201	8,105	2,120,485	18,041
Multinationals	6,287	6,631	553,642	7,942
<i>Foreign-owned</i>	<i>5,925</i>	<i>6,258</i>	<i>468,731</i>	<i>7,047</i>
<i>Irish-owned</i>	<i>362</i>	<i>373</i>	<i>84,911</i>	<i>895</i>
Non-multinationals	157,914	1,474	1,566,843	10,099

Source: Revenue Data



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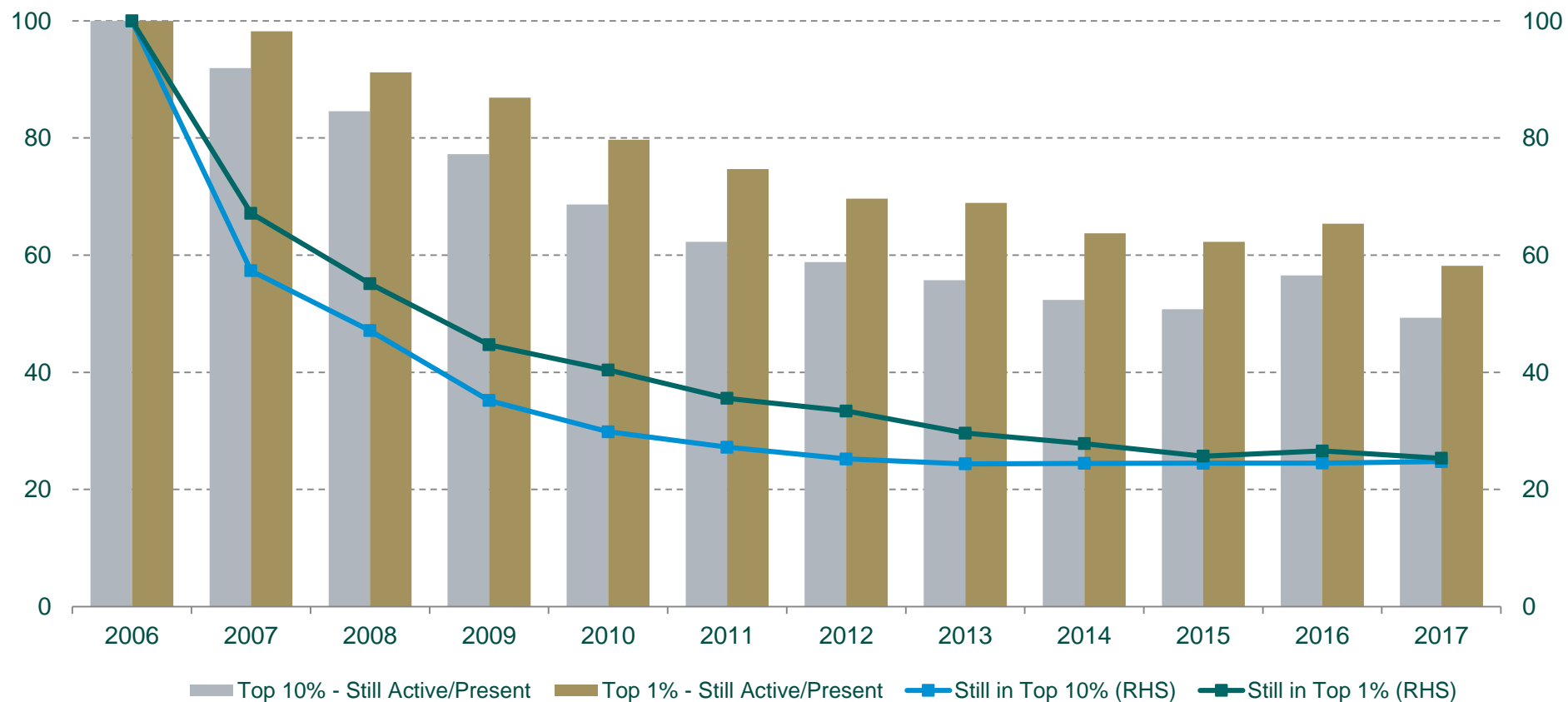
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Source: Revenue Data



Background - survival rates

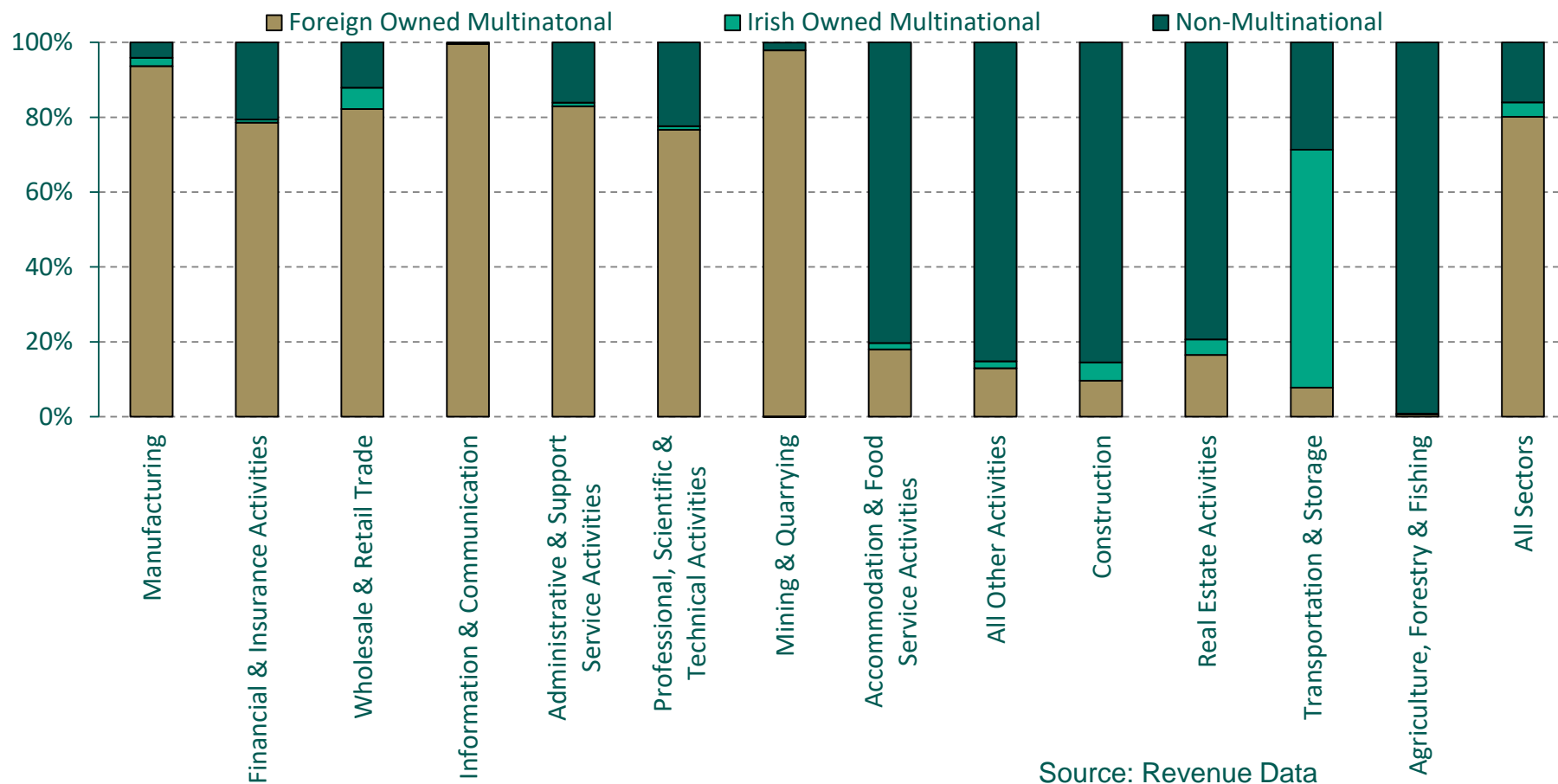
Corporation tax receipts and survival, per cent





Background - CT receipts by sector and ownership

Shares between foreign/Irish and non-multinational, per cent



Source: Revenue Data



Background - CT receipts by sector and ownership

Shares between foreign/Irish and non-multinational, per cent

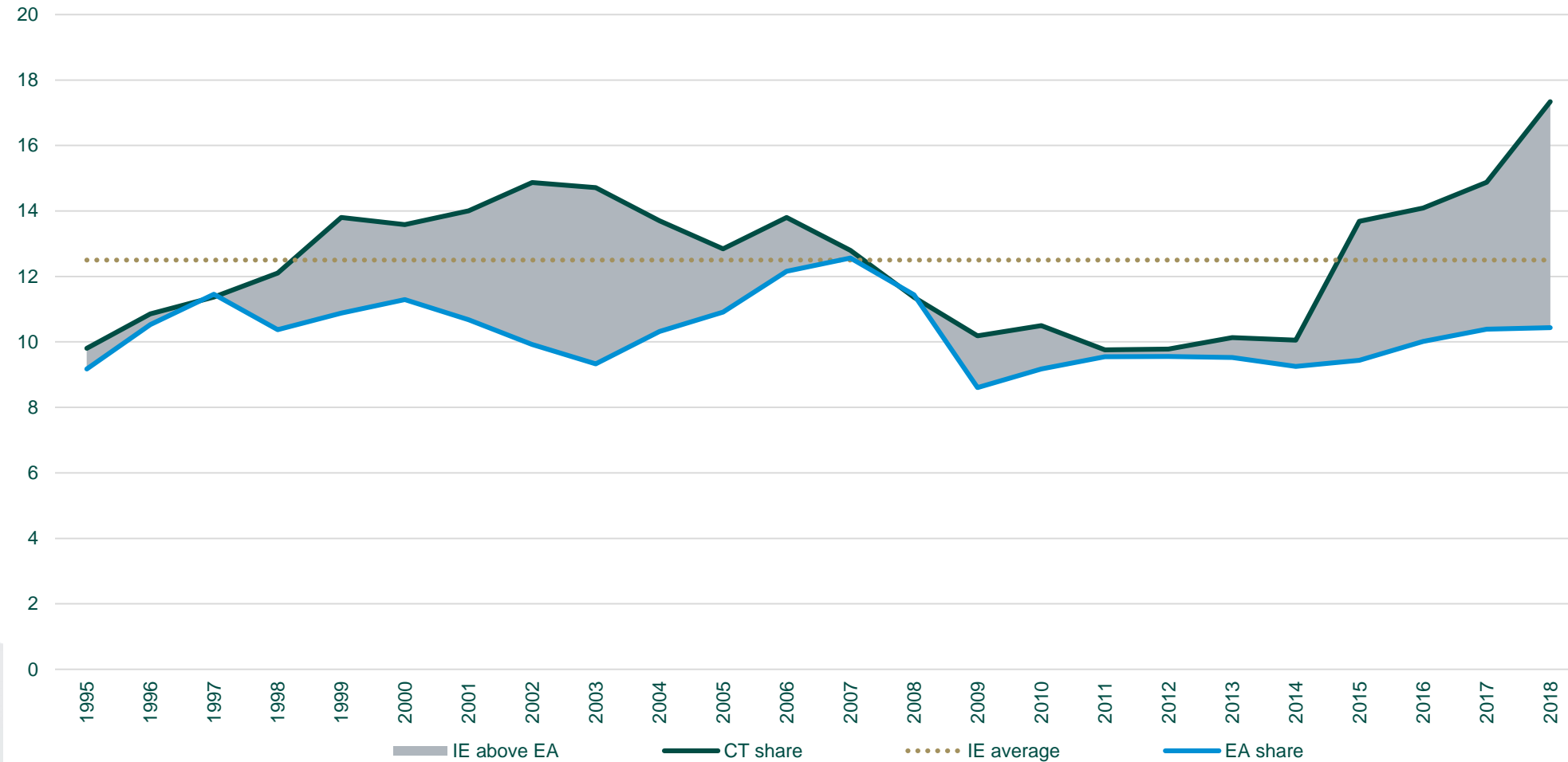


Source: Revenue Data



Background – Irish CT receipts in context

Ireland relative to the EA, per cent of total tax revenues





Forecasting and Modelling CT

Forecasting approach in line with methods adopted domestically and internationally

Recent '**Tax Forecasting Methodological Review 2019**' (December 2019, Department of Finance)

Available here: <https://www.gov.ie/en/publication/76468a-tax-forecasting-methodological-review-2019/>

$$\text{Corporation Tax}_{t+1} = (\text{Corporation Tax}_t - T_t) * (d(\text{Macro}_{t+1}) * E) + T_{t+1} + M_{t+1} + J_{t+1}$$

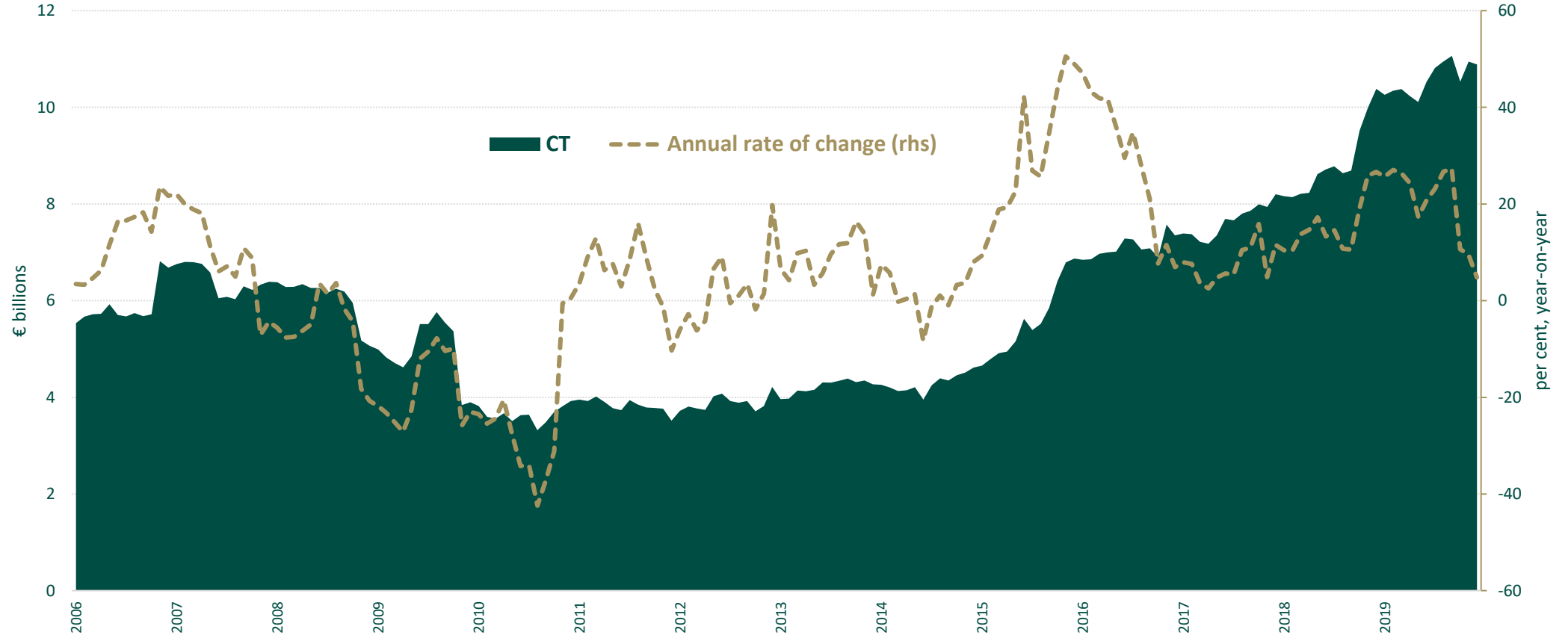
Key inputs:

- expected outturn for the current year
- the macro driver (including an elasticity)
- known one-offs
- policy changes
- judgement/expertise



Forecasting CT - recent trends

CT receipts and growth rates





Forecasting – recent performance

Taxes have outperformed relative to forecasts in recent budgets

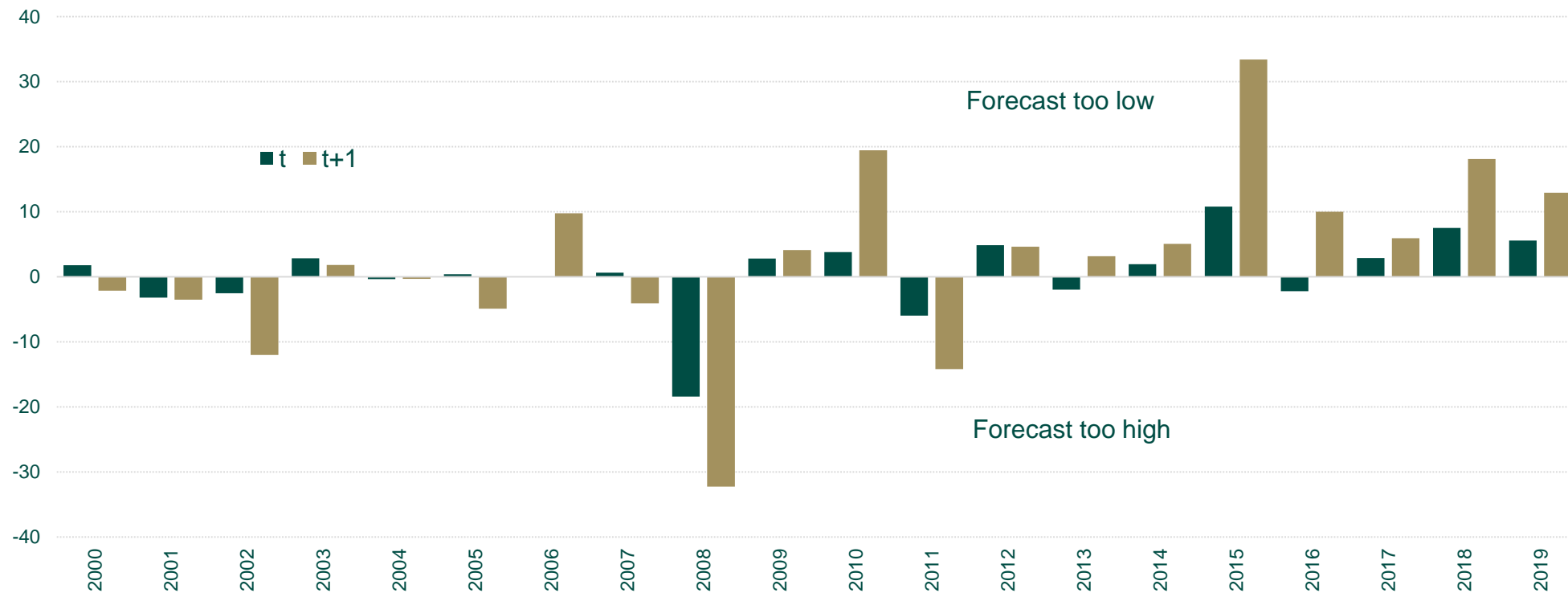
Recent tax forecasting review report (December) noted:

- CT marked by sizable forecast errors
- well known difficulties in forecasting CT exacerbated in recent years
- limitations with the existing equation – macro driver (and elasticity) not fully picking up CT
- importance of the residual and judgement in the equation



Forecasting – how accurate are forecasts?

CT forecast errors – current and year-ahead basis, per cent

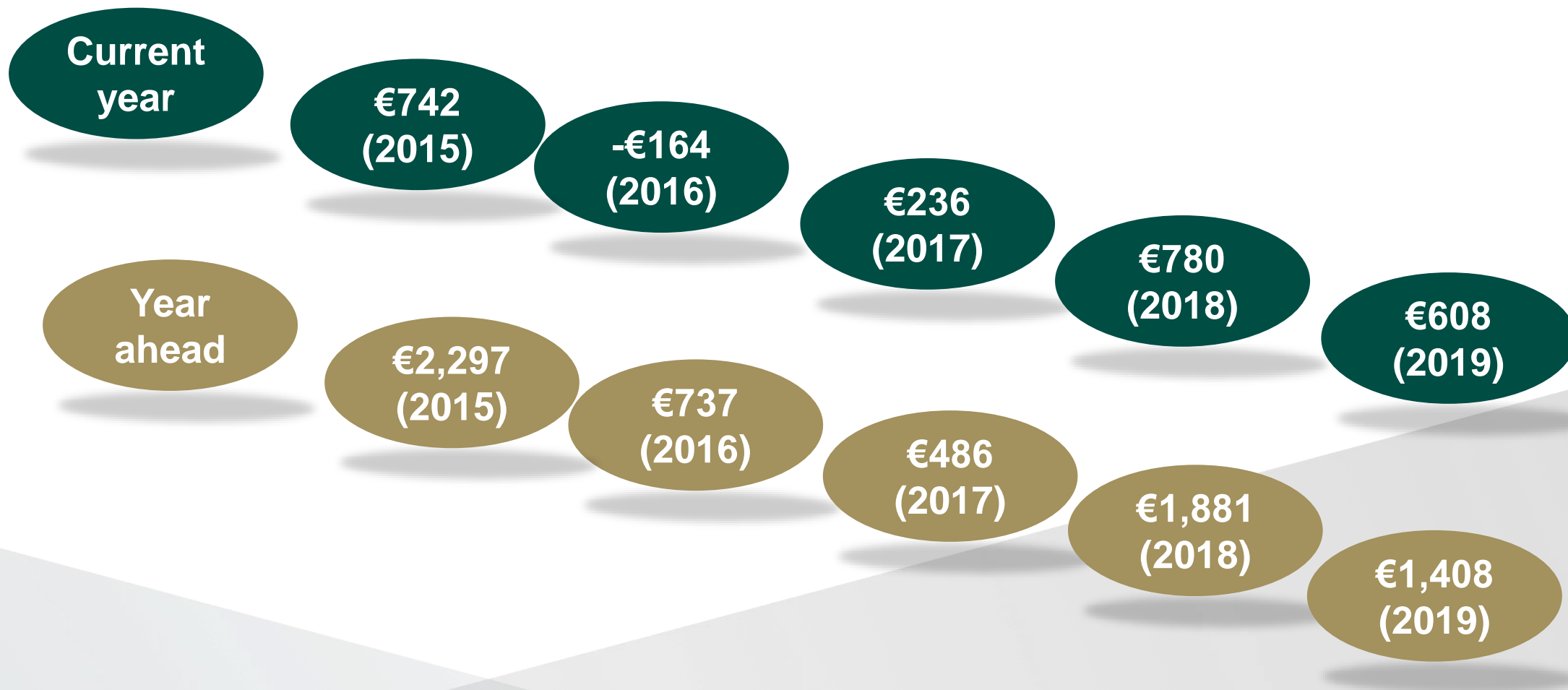


For more details,
see: [Tax Forecasting Methodological Review 2019](#) (Department of Finance)



Forecasting CT - gap between forecasts and outturn

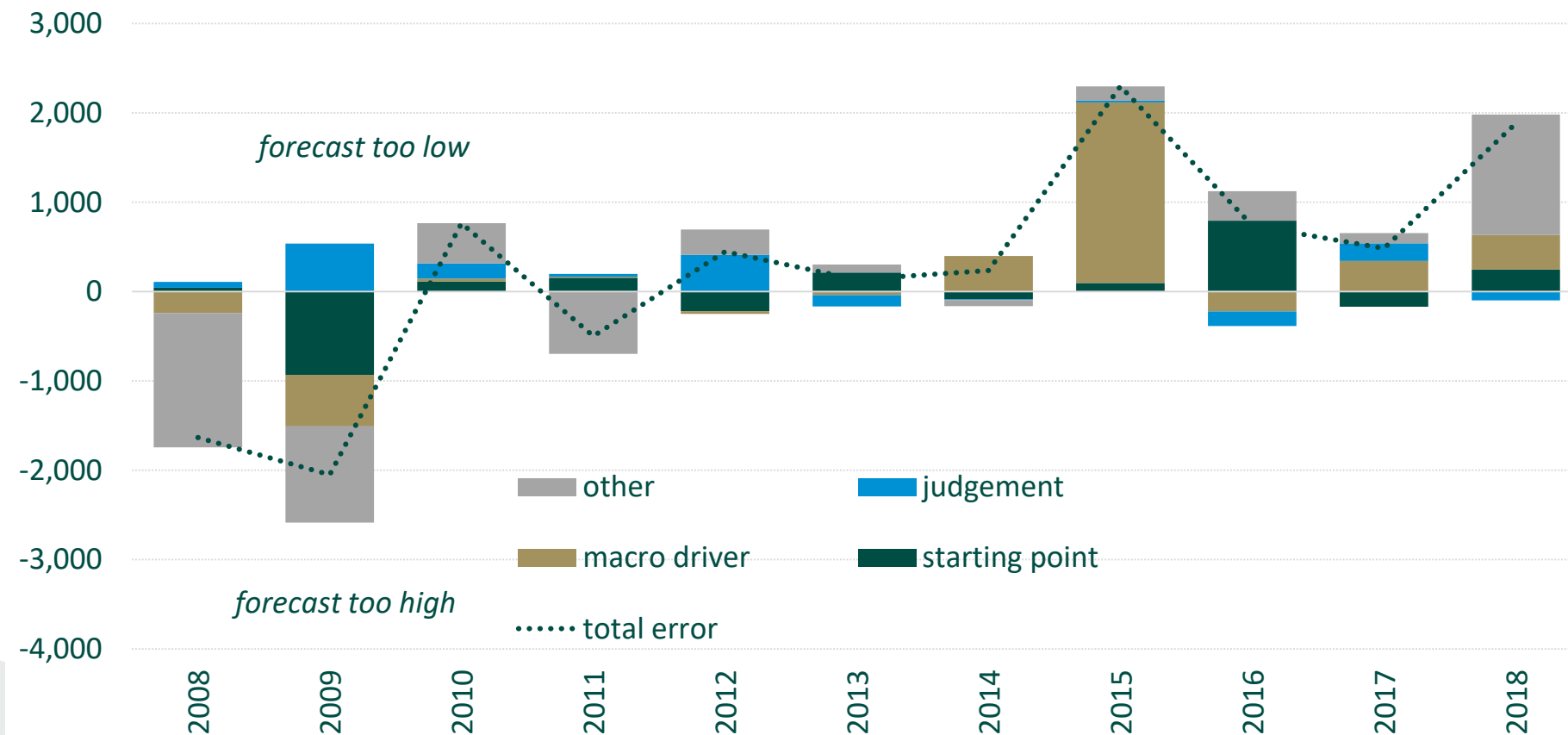
€ millions





Forecast errors – sources

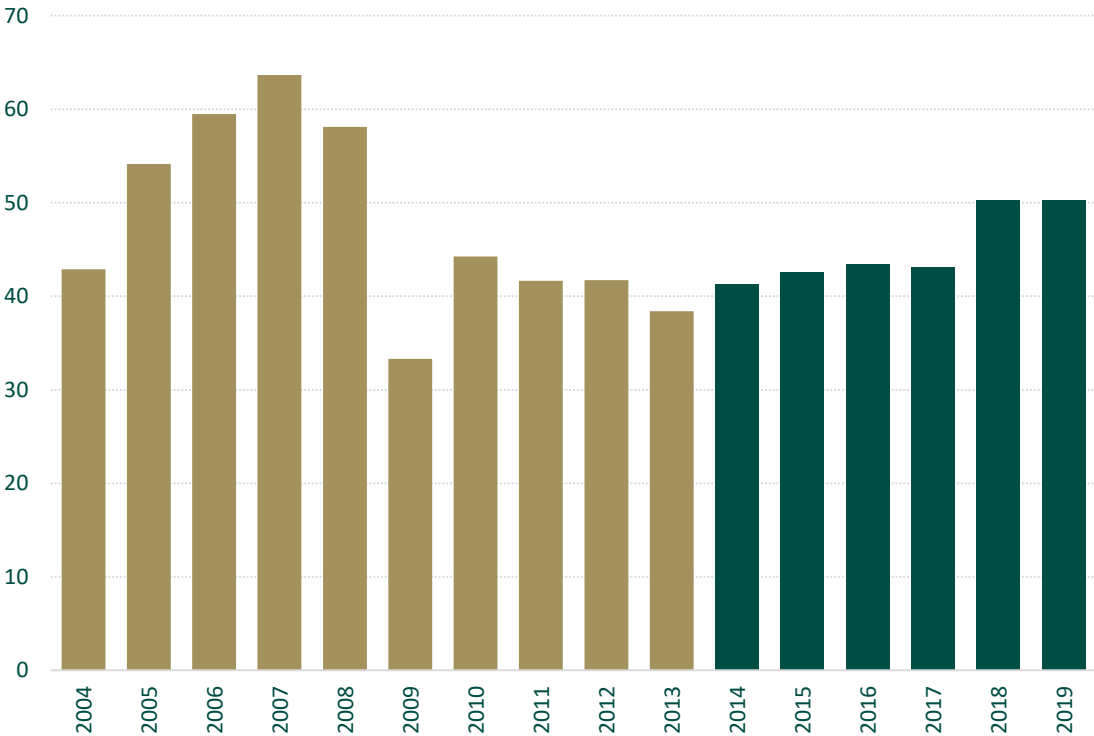
Decomposition, € millions



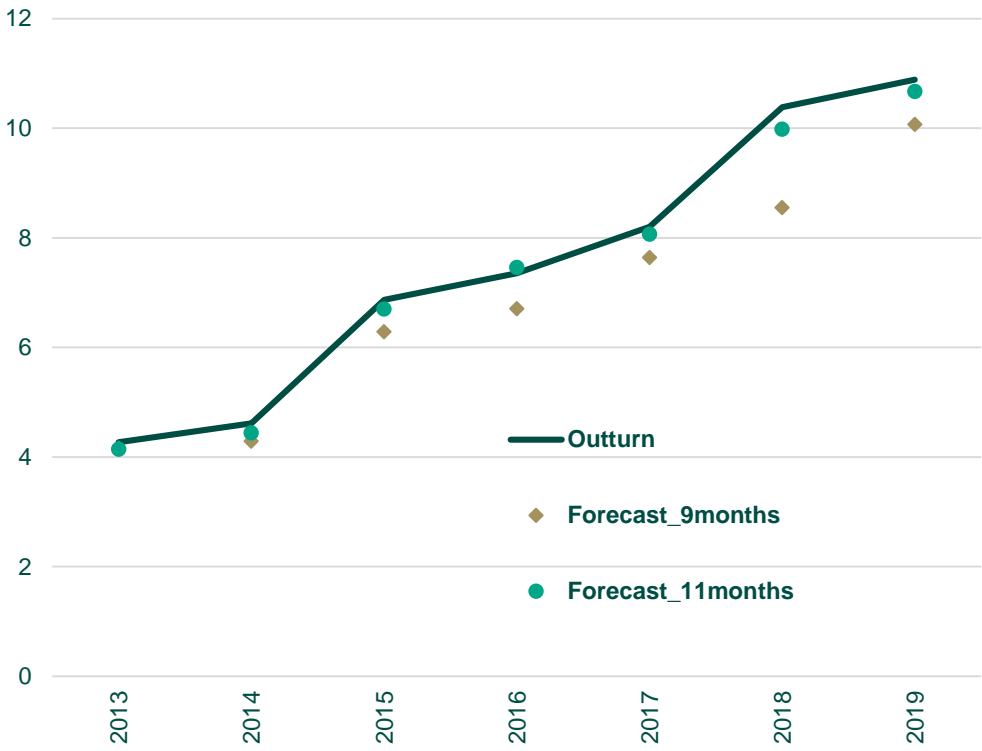


CT forecast errors – the issue of timing...

Share of CT receipts post-September, per cent



Regress CT on 9 and 11 months of data, € billions





Modelling Corporation Tax

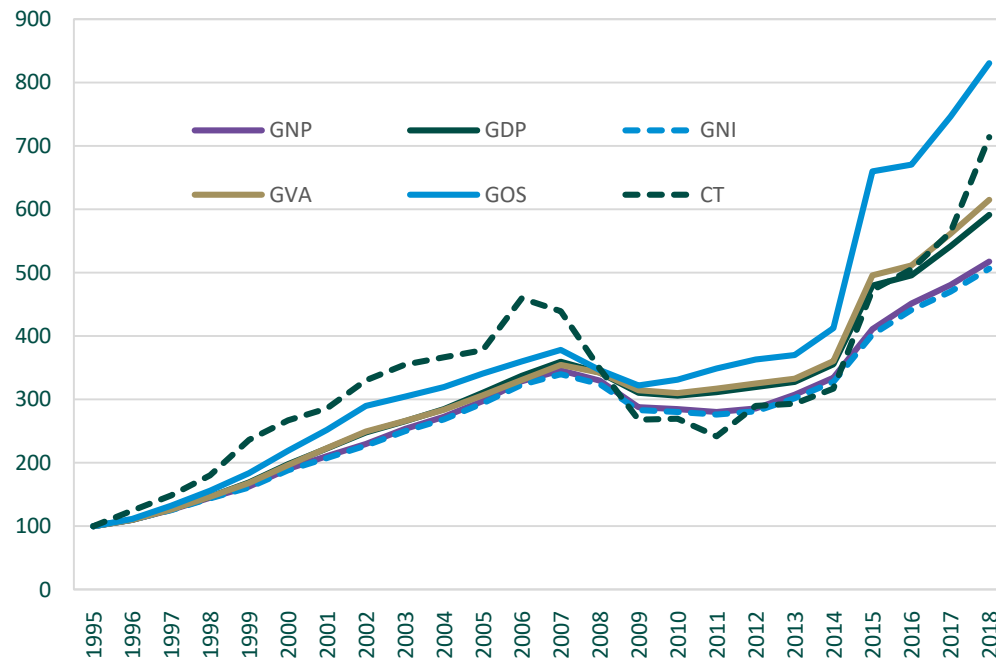
- Variety of error correction models used (ECMs)
- ECM/VECM approaches have become a popular means of modelling time series data where there is a strong prior that variables are cointegrated (i.e. a long run relationship exists)
- In the VECM, CT is modelled as a function of the change in the tax base as well as changes to its own lagged values.
- **Assess the 2018 CT outturn using these a range of these models**



Modelling Corporation Tax

Two considerations – macro drivers and elasticities

CT receipts and selected aggregates, 1995=100

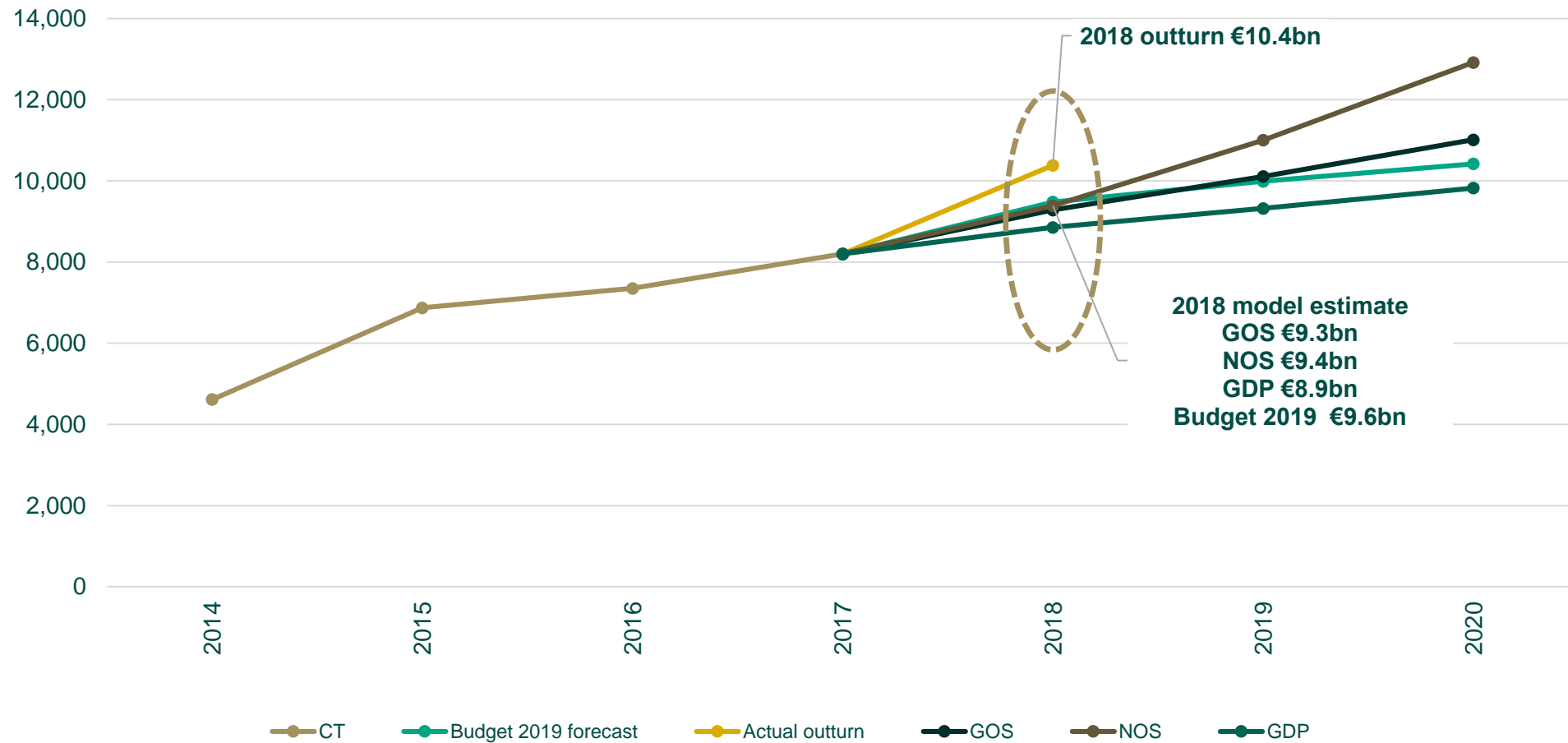


CT elasticity over time (gross operating surplus)



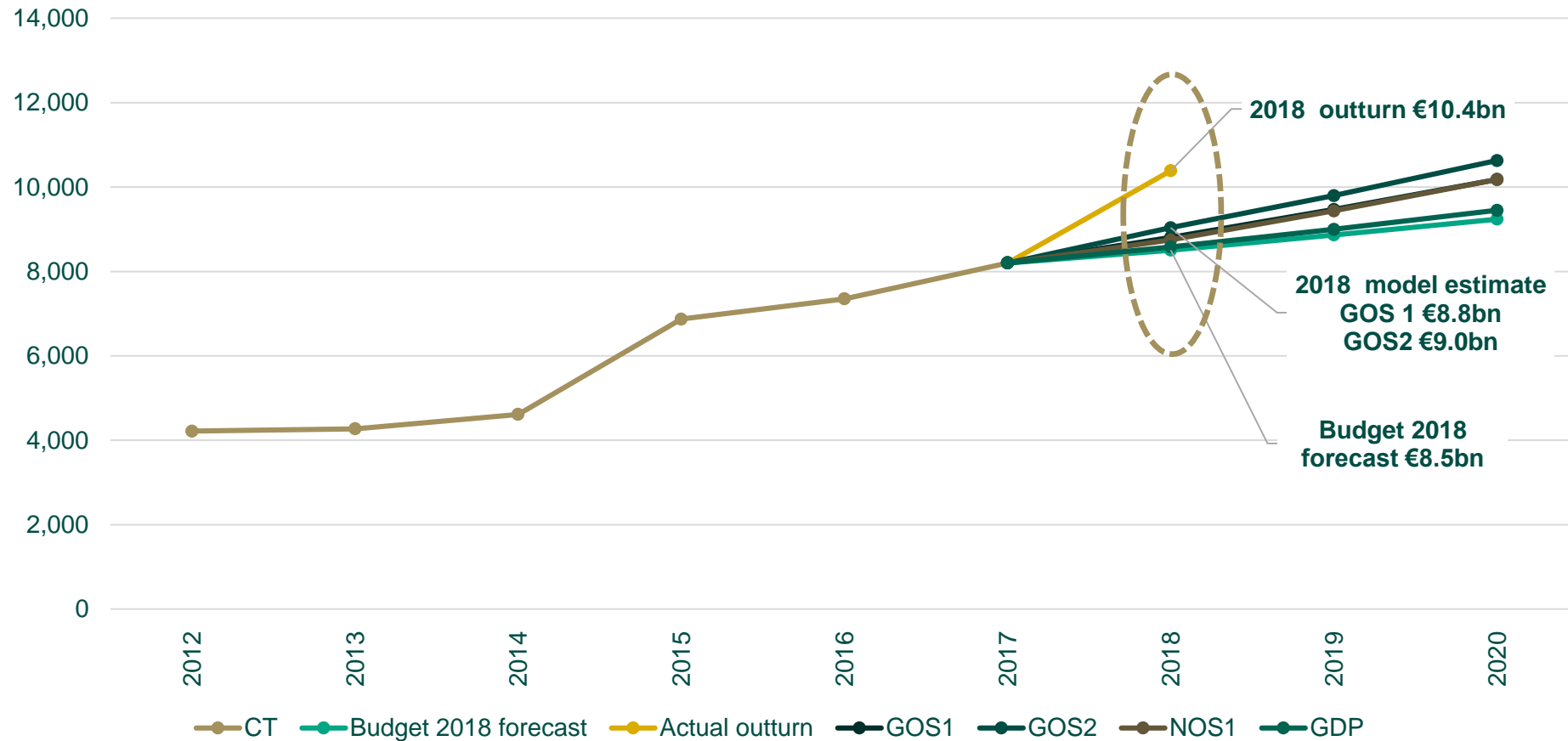
Modelling CT – the case of 2018

CT outturn relative to model, current year basis, € millions



Modelling CT – the case of 2018

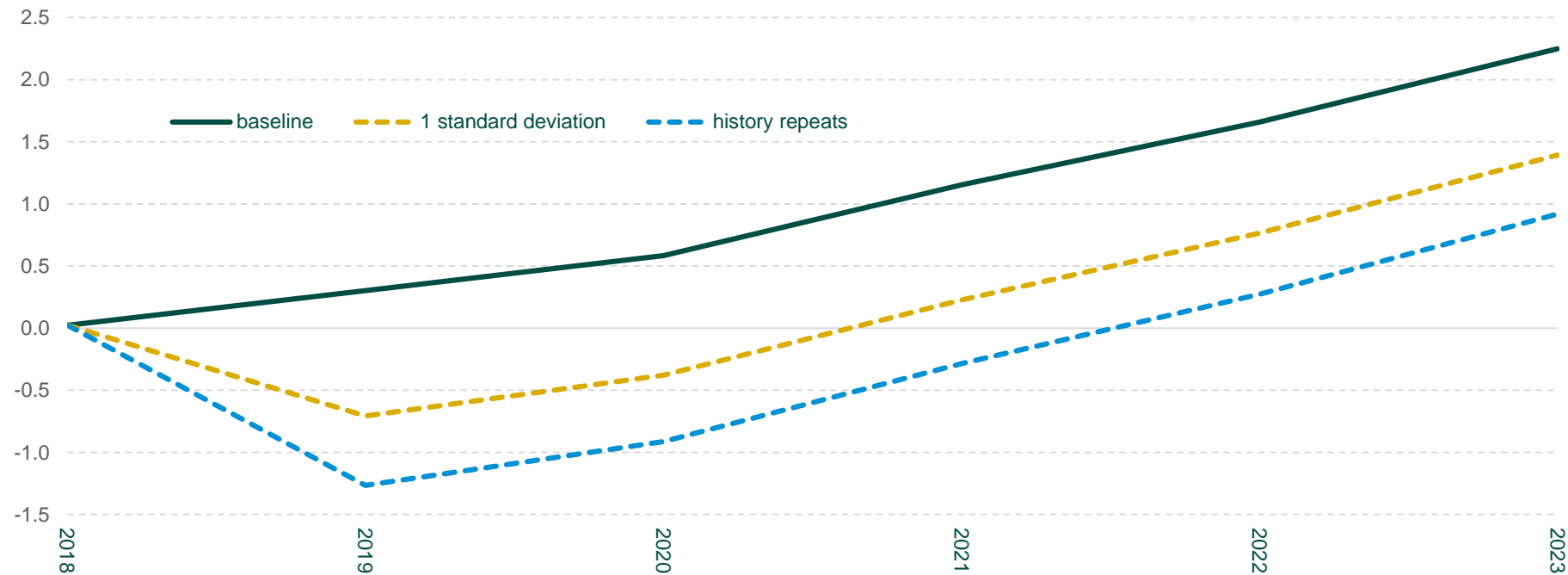
CT outturn relative to model, year-ahead basis, € millions



Modelling CT - sensitivity analysis



Scenarios for the General Government Balance – shocks to CT receipts, per cent



Main Findings



- CT remains a difficult tax to forecast and to model
- Receipts are highly concentrated
- Paper – tries to tackle these issues using micro and macro data
- Value of in-year estimates for the tax take but rich insights from econometric models
- Difficulty in quantifying CT ‘excesses’ relative to norms
- Other parts of the paper – timing of receipts, role of international factors, elasticities

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Annex



US variables



CT and S&P 500, 1994-2018

