

Tourism VAT Relief: A Behavioural Cost-Benefit Analysis with Off-Peak Targeting

Abstract

Purpose - This paper tests whether tourism Value Added Tax (VAT) relief delivers welfare gains once fiscal costs and behavioural responses are included, and whether policy design (timing/targeting) matters more than rate depth. It compares uniform year-round VAT cuts with off-peak targeted VAT relief, modelling incomplete pass-through, seasonal demand elasticity and discounted welfare.

Design/methodology/approach - A regionally calibrated behavioural cost-benefit simulation is applied to Dorset (UK). Scenarios reduce VAT to 12.5% or 5%, either year-round or only in off-peak months, over a ten-year horizon. The model integrates consumer/producer surplus, employment and fiscal feedbacks; robustness is tested via sensitivity analysis and Monte Carlo simulation.

Findings - VAT cuts increase turnover and employment, but uniform year-round relief does not reach welfare breakeven after discounting fiscal losses. The key contribution is showing that off-peak targeting markedly improves welfare efficiency, producing benefit-cost ratios close to one while cutting fiscal exposure by more than two-thirds versus uniform cuts. Deeper cuts generate larger absolute gains but lower proportional efficiency unless pass-through and demand responsiveness are exceptionally high; overall, timing and targeting dominate rate depth.

Practical implications - VAT relief is most defensible as a time-bound, off-peak tool. Effectiveness increases when paired with price transparency, coordinated off-peak marketing and shoulder-season product development to strengthen consumer price signals and incremental demand.

Originality/value - The paper advances tourism taxation research by identifying which VAT design maximises welfare efficiency under realistic behaviour, integrating seasonality, incomplete incidence and discounted welfare appraisal in a transferable regional framework.

Keywords: Tourism taxation; VAT policy design; Seasonality; Welfare analysis; Price pass-through; Demand elasticity; Cost-benefit analysis; Destination competitiveness; Sustainable tourism policy

1. Introduction

Tourism and hospitality are a cornerstone of the UK economy. However, they remain unusually exposed to policy-induced price shocks because much of tourism consumption is discretionary and therefore highly price-sensitive. Prior to recent inflationary pressures, the sector generated over £257 billion in Gross Value Added (GVA) and supported approximately 3.8 million jobs (WTTC, 2025), suggesting that relatively small price changes can translate into substantial demand, employment, and fiscal effects. At the centre of this exposure is Value Added Tax (VAT), which directly affects the affordability of accommodation, food, and leisure services and therefore remains a recurring focus of policy debate. However, despite sustained advocacy for VAT relief, there is limited welfare-integrated evidence on whether tourism VAT reductions generate net social gains once fiscal costs are discounted and when behavioural responses differ across market segments and seasons. This study addresses this gap by evaluating the ten-year fiscal and welfare implications of alternative VAT reforms in a UK destination, explicitly accounting for price pass-through, demand elasticity, and policy design features such as rate depth, duration, and seasonal targeting.

Tourism taxation sits at the intersection of demand responsiveness, destination competitiveness, and public finance sustainability. It also interacts closely with government revenue capacity. Evidence indicates that rising tourism receipts can significantly increase non-resource tax revenues, reinforcing the fiscal importance of tourism demand (Gnangnon, 2020). Among OECD member states, the UK has traditionally applied one of the highest VAT rates to tourism services (20% on most accommodation and restaurant sales) compared with an average of 10-12% across the EU (European Commission, 2023; OECD, 2022). This differential is frequently interpreted as a competitiveness constraint, particularly when considered alongside the UK's low price-competitiveness ranking (113th out of 119) in the World Economic Forum's Travel and Tourism Development Index (2024) and a 5.3% decline in international tourist spending since 2019 (WTTC, 2025). These indicators motivate systematic evaluation of VAT reforms not only as sector support measures but also as instruments with potential macro-fiscal consequences.

Industry stakeholders have therefore contested the UK's VAT rate structure. The UKHospitality (2025) TaxedOut Campaign and the Tourism Alliance (2025) argue that higher VAT reduces international competitiveness, discourages domestic short breaks, and constrains job creation, especially in rural and coastal regions. Earlier modelling by the Cut Tourism VAT

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3 Campaign suggested that reducing tourism VAT to 5% could generate between 80,000 and
4 120,000 new jobs nationally over ten years, with spillover benefits for local supply chains
5 (UKHospitality, 2023a). However, subsequent evidence cautions that such projections may
6 overstate demand-side effects, given that VAT cuts are frequently only partially passed through
7 to consumer prices and that demand responsiveness varies markedly across segments and time
8 periods (Benzarti and Carloni, 2019; Löwe, 2024). Moreover, the regional tourism VAT
9 literature rarely embeds these behavioural mechanisms within a discounted welfare framework,
10 limiting the ability to assess whether any gains persist once fiscal costs are fully accounted for
11 (Bernardino et al., 2025). As a result, existing evidence provides incomplete guidance on how
12 VAT interventions affect distinct components of tourism demand, such as peak versus off-peak
13 activity, and whether the resulting benefits exceed the fiscal costs over time.
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23 From a policy perspective, the UK government has periodically used VAT reductions as
24 countercyclical interventions. Historical precedent suggests that temporary VAT cuts can
25 stimulate consumption. For instance, the 2008-2009 reduction of the standard rate from 17.5%
26 to 15% raised household consumption by approximately 1% (Barrell and Weale, 2010;
27 Chirakijja et al., 2009; Crossley et al., 2014). More recently, during the COVID-19 pandemic,
28 a targeted VAT rate of 5% (July 2020-September 2021) followed by 12.5% (October 2021-
29 March 2022) supported a rapid recovery in domestic tourism (Blundell et al., 2020; Department
30 for Digital, Culture, Media and Sport, 2023). These measures were associated with increased
31 overnight stays and improved short-term business survival, particularly among SMEs
32 (UKHospitality, 2023b; House of Commons Library, 2025). Nevertheless, the long-term fiscal
33 sustainability of VAT relief remains contested. Evidence of asymmetric price adjustment,
34 where VAT reductions are not fully passed on, but VAT increases generate above-proportional
35 price rises, suggests that welfare gains may be eroded while revenue losses persist (Benzarti et
36 al., 2020; Benzarti et al., 2024). Recent reviews, therefore, emphasise that tourism taxation
37 entails trade-offs between short-term stimulus, fiscal revenue, destination competitiveness, and
38 sustainability objectives (Rossello-Nadal & Sard, 2026). This implies that the timing and
39 targeting of VAT relief may be at least as consequential as the headline rate change.
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54 The net effect of VAT reductions depends critically on two behavioural parameters: price pass-
55 through and the price elasticity of demand. Pass-through in service sectors often ranges
56 between 60% and 80%, and tourism demand elasticity varies by segment, season, and
57 destination structure, with more elastic responses typically observed for discretionary and off-
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3 peak travel (Cut Hospitality & Tourism VAT Campaign, 2022; Onnis et al., 2025). This
4 heterogeneity has direct policy implications; a VAT reduction applied in low-season months,
5 when spare capacity exists, may generate stronger proportional demand responses than the
6 same reduction applied during peak periods that are capacity-constrained. In addition,
7 differences in policy design, partial-year coverage, reduced rates, and seasonal application can
8 materially alter both the fiscal cost and the efficiency of VAT interventions (Enache, 2023;
9 Senyao et al., 2021). To address these methodological gaps, the present study integrates
10 elasticity-based demand modelling with a ten-year discounted cost-benefit analysis (CBA),
11 enabling explicit welfare-to-cost assessment under alternative VAT designs.
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20 Dorset is selected as the empirical case because it is among the UK's most tourism-dependent
21 counties and exhibits pronounced seasonality, high labour intensity, and a predominance of
22 SMEs. The county attracts more than 30 million day and overnight visitors annually, generates
23 approximately £1.7 billion in direct tourism turnover, and supports around 35,000 jobs when
24 direct, indirect, and induced effects are included (South West Research Company, 2024;
25 VisitEngland, 2023). Tourism demand in Dorset is dominated by domestic leisure travel and
26 short breaks, spanning coastal resorts, rural destinations, and heritage towns. Dorset's coastal
27 geography, protected natural landscapes, and heritage assets create pronounced peak-season
28 congestion alongside off-peak under-utilisation, with winter occupancy rates and business
29 activity falling sharply between November and March. These structural characteristics make
30 Dorset a policy-relevant setting for testing whether seasonally targeted VAT relief can yield
31 relatively larger welfare gains by stimulating demand where excess capacity and labour slack
32 are most pronounced. Data availability further strengthens the case, as regional accounts,
33 tourism satellite data, and input-output coefficients enable transparent calibration and
34 replication.
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47 Previous research suggests that fiscal measures which stimulate demand selectively and
48 temporarily can generate higher welfare gains in tourism-dependent regions, although the
49 capture of benefits by firms and modest employment effects require careful interpretation
50 (Blake et al., 2003; Kosonen, 2015; Löwe, 2024). Building on this insight, this study
51 conceptualises off-peak VAT relief as a demand-management instrument aimed at shifting
52 consumption into low-season periods rather than uniformly subsidising peak activity. Dorset,
53 therefore, provides an appropriate context for examining the behavioural and fiscal
54 implications of timing and targeting in tourism VAT policy.
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3 Against this backdrop, the study conducts a dynamic ten-year CBA of VAT reductions in
4 Dorset's tourism economy. Different VAT reform scenarios are evaluated: first, a full-year
5 reduction to 12.5%, replicating the temporary pandemic-era policy, and a deeper reduction to
6 5%, aligned with typical EU reduced-rate schemes. The second scenario tests partial-year VAT
7 reductions and a targeted seasonal scenario to examine whether relief delivered in off-peak
8 months produces greater welfare efficiency. The analysis combines elasticity-based demand
9 modelling, multi-year fiscal projections, and input-output multipliers within a regionally
10 calibrated partial-equilibrium framework. Welfare changes are computed using consumer and
11 producer surplus, enabling explicit welfare-to-cost comparisons that complement conventional
12 benefit-cost ratios (BCR). Consistent with the paper's policy focus, the off-peak scenario
13 applies a higher off-peak elasticity to reflect greater discretionary responsiveness in low-
14 demand months.

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25 The study contributes to the tourism taxation literature by providing a regionally
26 contextualised, behaviourally grounded, and welfare-integrated evaluation of VAT reform in a
27 UK destination. First, it quantifies how VAT changes propagate through local demand,
28 employment, and public revenues over a ten-year horizon under alternative policy designs.
29 Second, it identifies behavioural thresholds (combinations of pass-through and elasticity) under
30 which VAT reductions approach fiscal neutrality, thereby offering a transparent basis for policy
31 calibration. Third, it evaluates whether targeted off-peak VAT relief can improve proportional
32 efficiency while limiting fiscal exposure relative to uniform year-round cuts, responding
33 directly to calls for more nuanced and sustainability-aware approaches to tourism taxation
34 (Rossello-Nadal & Sard, 2026). The framework is adaptable to other regions and can support
35 evidence-informed design of spatially and seasonally sensitive tourism tax policies.
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45 **2. Theoretical Foundation**

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48 Tourism taxation has been widely examined in academic and policy research because it shapes
49 destination prices, competitiveness, investment incentives, and employment outcomes
50 (Benzarti and Carloni, 2019; Blake et al., 2003; Kosonen, 2015; OECD, 2022). Recent
51 syntheses emphasise that tourism taxation inevitably involves trade-offs between demand
52 stimulation, fiscal revenue, competitiveness, and sustainability objectives, rather than
53 generating unambiguous welfare gains (de Mooij et al., 2025; Rossello-Nadal & Sard, 2026).
54 This implies that evaluating VAT relief requires moving beyond output indicators (e.g.,
55 turnover) and explicitly comparing welfare gains against fiscal costs. Comparative evidence
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3 also suggests that destinations applying lower VAT rates to tourism services may experience
4 stronger arrivals and longer stays, although results depend on market structure and
5 implementation (UKHospitality, 2023a; Amores et al., 2023). Evidence from countries such as
6 France and Ireland suggests that VAT reductions can support turnover and employment in
7 accommodation and hospitality, but these effects typically arise through partial, rather than
8 full, pass-through of tax savings to consumers (Benzarti and Carloni, 2019; Carroll, 2025;
9 Deloitte, 2013). Accordingly, any credible appraisal must model VAT incidence (pass-
10 through) rather than assume that statutory changes are reflected one-for-one in consumer
11 prices.
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20 At the macroeconomic level, VAT changes have frequently served as countercyclical tools to
21 stabilise demand during downturns (HM Treasury, 2022). However, the tourism and hospitality
22 sectors exhibit pricing frictions and imperfect competition that can weaken the intended
23 transmission from tax cuts to consumer prices (Crawford et al., 2010). Recent research has
24 underscored the asymmetric nature of price transmission following VAT changes, where VAT
25 increases tend to pass through more strongly than VAT reductions, and this asymmetry
26 interacts with demand elasticities (the responsiveness of tourism consumption to price changes)
27 (Benzarti et al., 2020; Löwe, 2024). This asymmetry matters for policy efficiency: if consumers
28 see only muted price declines during VAT relief, consumer surplus gains may be smaller than
29 headline rate changes, while revenue losses remain substantial. Importantly, these behavioural
30 parameters are not uniform. Namely, pass-through and elasticity vary across tourism segments,
31 seasons, and destinations due to heterogeneity in consumer preferences and firm pricing
32 strategies (del Carmen Pérez-Ricardo and Garcia-Mestanza, 2025). Therefore, it is sensible to
33 have sensitivity testing across plausible behavioural ranges rather than relying on a single
34 "representative" parameter set.
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46 Beyond fiscal considerations, VAT policy has direct implications for welfare and economic
47 efficiency because it affects both consumer surplus (CS) (via prices) and producer surplus (PS)
48 (via margins and capacity utilisation). Conventional evaluations often emphasise turnover or
49 employment impacts, but welfare-based appraisal requires accounting for what is gained by
50 consumers and producers relative to what is foregone in public revenue. The literature
51 demonstrates that welfare outcomes depend not only on whether demand rises, but also on who
52 captures the benefits (consumers versus firms) and whether price transmission is sufficient to
53 justify the fiscal cost (Adedoyin et al., 2023; European Commission, 2017; Sheng and Tsui,
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3 2009). As a result, tourism tax policies can yield ambiguous outcomes even when demand
4 responds positively (Descals-Tormo and Ruiz-Tamarit, 2024). This justifies the use of
5 discounted CBA and BCRs to assess whether VAT relief approaches breakeven performance
6 in welfare terms.
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11 In addition, recent theory reinforces why specifying the structure of tourism demand matters
12 for tax-policy appraisal. Kawahara (2025) develops an optimal-tax framework in which a
13 "tourism good" is demanded alongside a domestic good and shows that optimal tourism
14 taxation and welfare effects depend crucially on demand responsiveness (elasticities) and the
15 way tourism taxes interact with other fiscal distortions (notably labour-income taxation). This
16 reinforces the logic of simulation-based tourism VAT appraisal: the fiscal-welfare trade-off
17 hinges on behavioural parameters that govern how tax changes translate into prices and
18 quantities, and these parameters can vary across seasons and segments.
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26 Regional tourism economies introduce additional complexity because destination structure and
27 firm composition shape both the magnitude and distribution of VAT relief benefits (HOTREC,
28 2025). Tourism-dependent regions often have high shares of SMEs and low operating margins,
29 so that VAT relief can affect business survival and hiring decisions (Artavanis, 2018; Blake et
30 al., 2003; Candela and Figini, 2012; Gazopoulou, 2012; OECD, 2022). However, the incidence
31 of benefits depends on competitive pressure and pricing behaviour; where pass-through is
32 incomplete, a larger share of gains may accrue to producers rather than consumers (Benzarti
33 and Carloni, 2019). Studies caution that these benefits may be uncertain or unevenly distributed
34 when pass-through is incomplete or when relief becomes politically difficult to reverse,
35 creating substantial fiscal costs and constraints on policy reversal (Beretta et al., 2023). This is
36 particularly relevant for "temporary" tourism VAT relief, where policy extension risks turning
37 short-run stabilisation into persistent revenue leakage (Parliamentary Budget Office, 2023).
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48 A parallel stream of research emphasises that seasonality and capacity utilisation are central to
49 the effectiveness of tourism interventions (Adedoyin et al., 2023; European Commission,
50 2017). For instance, tourism demand in many regions exhibits strong temporal fluctuations,
51 with peak-period crowding and off-peak underutilisation generating efficiency losses and
52 welfare costs (Cuccia and Rizzo, 2011; Zhang et al., 2021). Empirical work shows that off-
53 peak periods are commonly characterised by slack capacity, reduced occupancy, shorter
54 opening hours, and weaker labour demand (Corluka, 2019; Koenig-Lewis and Bischoff, 2005).
55 These insights suggest that VAT policy effectiveness could be mediated by seasonality. For
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3 example, relief targeted to low-demand periods can generate stronger incremental output and
4 employment effects, because spare capacity reduces displacement and increases the likelihood
5 of welfare-enhancing outcomes. This provides the behavioural rationale for off-peak VAT
6 targeting. When capacity constraints are weaker and travel is more discretionary, demand tends
7 to be more price-responsive, making a given VAT cut proportionally more efficient. (Choe et
8 al., 2019; Dredge and Gyimóthy, 2017; Xie, 2020).
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12 Taken together, the literature indicates that tourism VAT relief is most plausibly justified when
13 it is designed to exploit periods of higher demand responsiveness and slack capacity, conditions
14 most closely associated with off-peak travel. This motivates the paper's emphasis on evaluating
15 off-peak targeted VAT reductions alongside full-year and temporary alternatives, and it
16 provides the theoretical basis for applying different elasticities by season in the empirical
17 modelling.
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22 Figure I recaps how VAT adjustments affect tourism outcomes through price pass-through and
23 demand response, while the magnitude and welfare incidence of these effects are conditioned
24 by seasonality, submarket composition, and capacity constraints. Building on this framework,
25 the analysis treats pass-through (pricing behaviour) and elasticity (consumer responsiveness)
26 as the two core behavioural channels through which VAT relief translates into turnover,
27 employment, and welfare effects. The research design adopts a regionally calibrated partial-
28 equilibrium simulation model for ex-ante policy evaluation of VAT reduction scenarios,
29 focusing on welfare-integrated outcomes rather than precise point forecasts or causal estimates
30 of real-world impacts. Consistent with the paper's policy focus, the simulation compares
31 uniform year-round VAT cuts with off-peak targeted relief and evaluates outcomes using fiscal
32 NPVs, welfare NPVs, and BCRs under transparent behavioural assumptions and sensitivity
33 ranges.
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56 **3. Methodology**

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3 The model is grounded in standard tax incidence and tourism demand theory to evaluate
4 alternative VAT reform scenarios in the tourism sector. It traces a transmission mechanism by
5 which a statutory change in VAT is translated into consumer prices through incomplete pass-
6 through, thereby affecting tourism demand, sectoral turnover, employment, welfare, and
7 government revenues. This study is designed as an ex-ante policy simulation to compare
8 counterfactual VAT designs under transparent behavioural assumptions, rather than an ex-post
9 econometric estimation of causal effects. This approach is appropriate because the specific
10 VAT scenarios lack sufficient repeated variation and credible control groups for quasi-
11 experimental identification at the destination level.
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20 The primary objective variables are: (i) changes in tourism turnover, (ii) employment effects
21 measured in both first-year full-time equivalent (FTE) changes and cumulative job-years, (iii)
22 net welfare effects defined as the sum of CS and PS, and (iv) the net fiscal impact for
23 government, incorporating VAT receipts and partial offsets from labour and corporate taxation.
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28 Alternative empirical strategies such as difference-in-differences or synthetic control were not
29 adopted because the specific VAT counterfactuals analysed (full-year vs off-peak, 12.5% vs
30 5%) do not provide repeated, destination-level tax variation with credible control groups over
31 a sufficiently long, consistent time series. In this setting, quasi-experimental estimation would
32 risk spurious precision and limited external validity. We therefore adopt an ex-ante, elasticity-
33 based simulation to provide transparent scenario testing under evidence-based parameter
34 ranges.
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41 We report short-run employment impacts as first-year FTE changes and cumulative
42 employment impacts as job-years (the discounted sum of annual FTE changes over the
43 appraisal horizon). To ensure transparency, the model is developed sequentially by specifying
44 (1) price formation and VAT pass-through, (2) demand and turnover responses, (3) welfare
45 effects, (4) fiscal incidence and offsets, (5) employment impacts, and (6) multi-year
46 discounting and robustness analysis.
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52 **3.1. Model specifications**

53 *3.1.1. Price formation and VAT pass-through*

54 Let p_0 denote the baseline consumer price (VAT-inclusive) and r_0 the baseline VAT rate.
55 Because VAT is ad valorem, the VAT-inclusive price satisfies:
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$$p_0 = p_n(1 + r_0)$$

where p_n is the net-of-tax producer price.

Suppose the VAT rate is reduced from r_0 to r_1 and let θ denote the pass-through parameter, defined as the proportion of the statutory VAT reduction reflected in lower consumer prices. The post-reform consumer price is:

$$p_1 = p_n(1 + r_0) - \theta p_n(r_0 - r_1)$$

Expressing this in proportional terms, the VAT-induced proportional change in the consumer price \hat{p} is:

$$\hat{p} = \frac{p_1 - p_0}{p_0} = -\theta \frac{(r_0 - r_1)}{1 + r_0}$$

This proportional price change is the key input into the demand-response component of the model.

3.1.2. Demand response and turnover effects

Tourism demand is assumed to follow a constant-elasticity structure (Gunter and Smeral, 2016). Let q denote tourism quantity (e.g., visits or expenditure volume), and let ε denote the price elasticity of tourism demand (annual), defined as:

$$\varepsilon = \frac{\partial q/q}{\partial p/p}$$

Under this log-linear specification, the proportional change in demand is $\hat{q} = \varepsilon \hat{p}$ and the absolute change is $\Delta q = q_0 \hat{q}$.

In addition, tourism turnover is defined as the product of price and quantity. Let T_0 denote the baseline annual tourism turnover and ΔT denote the turnover change induced by the VAT reform. Using a first-order approximation, the proportional change in turnover is:

$$\hat{T} = \hat{p} + \hat{q} = \hat{p}(1 + \varepsilon) \text{ therefore,}$$

$$\Delta T = T_0 \hat{T}$$

3.1.3. Coverage and off-peak targeting

For policies that apply only part of the year, only a fraction c of baseline turnover is treated. Therefore, covered turnover is:

$$T_c = cT_0$$

In off-peak scenarios, coverage is set empirically to $c = s_{off}$ where s_{off} is the share of annual turnover occurring in Nov-Mar. In these scenarios, the VAT reduction applies only to the treated share T_c , and demand in that block is parameterised using a higher off-peak elasticity ε_{off} (central value -1.6). The untreated share $(1 - c)T_0$ remains at baseline settings for the year.

3.2. Welfare analysis: consumer and producer surplus

Changes in turnover do not fully capture welfare effects. The model, therefore, evaluates welfare using consumer and producer surplus. For small price changes, the change in CS can be approximated using a second-order Harberger triangle under constant elasticity demand:

$$\Delta CS \approx -T_0 \left[\hat{p} + \frac{1}{2} \varepsilon \hat{p}^2 \right]$$

On the other hand, PS reflects additional profits accruing to firms from changes in turnover. Let μ denote the operating profit margin in tourism. The change in producer surplus is:

$\Delta PS = \mu \Delta T$ therefore, total welfare change is:

$$\Delta W = \Delta CS + \Delta PS$$

3.3. Fiscal incidence and tax offsets

VAT reforms affect government revenues through multiple channels. The change in VAT receipts is modelled as the direct loss on covered turnover, partially offset by VAT on induced turnover changes:

$$\Delta VAT = -(r_0 - r_1)T_c + r_1 \Delta T$$

In addition, increased turnover generates higher taxable profits and wage income. The change in taxable profit is $\Delta \pi = \mu \Delta T$ and the implied change in corporate tax revenue, with corporate tax rate τ_c , is $\Delta CT = \tau_c \Delta \pi$.

In addition, labour-based tax revenues are linked to the labour share of turnover ω and the combined labour tax rate $(\tau_i + \tau_e)$:

$\Delta LT = (\tau_i + \tau_e) \omega \Delta T$ Total fiscal impact is therefore:

$$\Delta F = \Delta VAT + \Delta CT + \Delta LT$$

To test robustness, fiscal impacts incorporate leakage, defined as the share of incremental local wage/profit channels that does not accrue locally; leakage reduces ΔCT and ΔLT (the local component of producer surplus), while VAT receipts remain modelled on total spending.

3.4. Employment effects

Employment effects are derived from changes in turnover using an employment-intensity approach. Let α denote employment intensity (jobs per £1m turnover). The change in direct employment is:

$$\Delta E_{direct} = \alpha \frac{\Delta T}{10^6}$$

Indirect and induced employment effects are incorporated using an employment multiplier m_1 , yielding:

$$\Delta E = m_1 \Delta E_{direct}$$

For multi-year analysis, cumulative employment impacts are expressed as job-years (discounted):

$$JY = \sum_{t=1}^T \Delta E_t df_t$$

3.5. Multi-year projections and discounting

Long-term effects are assessed over a ten-year horizon. Let g denote the real growth rate of tourism turnover. Turnover in year t is:

$$T_t = T_0(1 + g)^{t-1}$$

factor in year t will be:

$$df_t = \frac{1}{(1 + \delta)^t}$$

Finally, NPVs are:

$$NPV_W = \sum_{t=1}^T \Delta W_t df_t, \quad NPV_F = \sum_{t=1}^T \Delta F_t df_t$$

and BCR is defined as:

$$BCR = \frac{NPV_W}{|NPV_F|}$$

3.6. Robustness and parameter calibration

Deterministic sensitivity analysis and Monte Carlo simulation serve as robustness checks by testing whether results hold across plausible behavioural and structural assumptions. Behavioural parameters, including demand responsiveness (ε , ε_{off}), VAT pass-through (θ), and coverage (c / s_{off}), are varied across plausible ranges using deterministic grids and probabilistic simulation (e.g., 5,000 draws). Structural sensitivities vary seasonality intensity (s_{off}) and labour intensity (α) to test robustness across destination structures. Discount rates (δ) and appraisal horizons are also varied, and leakage is tested over 0-40%. Table I provides a consolidated summary of all parameters, definitions, sources, and calibration choices.

"Table I about here"

4. Results

This section presents simulation results for VAT reform scenarios in Dorset's tourism economy. Four policy interventions are evaluated: a reduction to 12.5% (pandemic-era policy), a reduction to 5% (EU-style reduced rate), an off-peak (Nov-Mar) targeted reduction to 12.5%, and an off-peak (Nov-Mar) targeted reduction to 5%. All results should be interpreted as destination-level impacts for Dorset rather than national effects. Key behavioural parameters, particularly tourism demand elasticity and VAT price pass-through, are explored through deterministic sensitivity analysis with an expanded exploratory design, and uncertainty is further assessed using Monte Carlo simulation. Results are reported as first-year impacts, ten-year discounted fiscal and welfare outcomes, probabilistic robustness, and an integrated comparison of policy designs.

4.1. First-Year Effects

Table II summarises the first-year impacts of the VAT reform scenarios under central behavioural assumptions ($\theta = 0.7$; $\varepsilon = -1.3$ for full-year policies; $\varepsilon_{off} = -1.6$ for off-peak

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3 targeting). Although a statutory reduction in VAT from 20% to 12.5% appears large, the
4 implied reduction in final consumer prices is materially smaller because VAT is only one
5 component of the consumer-facing price and because pass-through is incomplete, consistent
6 with evidence from the hospitality sector (Crawford et al., 2010; OECD, 2022).
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10 Using elasticity values grounded in the tourism literature (Gallet & Doucouliagos, 2014;
11 Rossello-Nadal & Santana-Gallego, 2022), demand responses are therefore moderate rather
12 than dramatic. Under a full-year cut to 12.5%, turnover increases by £23.02 million and
13 employment by 492.70 jobs, with a first-year government net revenue impact of -£89.29
14 million and welfare gains of £78.62 million.
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20 The deeper 5% VAT rate produces proportionally larger turnover and employment gains:
21 turnover increases by £47.46 million and employment by 1,015.60 jobs, but at a substantially
22 larger fiscal cost (-£194.79 million), even as welfare gains rise (£162.32 million). This pattern
23 suggests that deeper, uniform VAT cuts expand total benefits but do so with diminishing
24 proportional efficiency.
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29 In the off-peak targeted scenario (Nov-Mar), applying a 12.5% rate only to the off-peak
30 turnover share increases turnover by £14.60 million and employment by 312.49 jobs, with a
31 much smaller first-year fiscal cost (-£26.41 million) and welfare gains of £25.52 million. The
32 stronger proportional performance of off-peak targeting reflects the combination of restricted
33 coverage (31.5% of annual turnover) and higher demand responsiveness in low-season months.
34 Similarly, the off-peak 5% cut yields turnover gains of £30.31 million, employment of 648.74
35 jobs, fiscal cost of -£58.75 million, and welfare gains of £53.10 million.
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Overall, the first-year results highlight a clear trade-off: VAT relief stimulates demand and employment, but realistic price adjustments and incomplete pass-through constrain the scale of these gains.

4.2.Ten-Year Cumulative Impacts

Table III scales the first-year fiscal and welfare effects into discounted ten-year NPVs using the baseline growth and discounting assumptions reported in Table I. In this case, none of the VAT strategies achieves fiscal neutrality over the simulation horizon under the central assumptions. The full-year 12.5% VAT cut generates NPV welfare (NPV_w) gains of £721.28 million but incurs an NPV fiscal (NPV_f) loss of -£819.13 million, yielding a BCR of 0.88. The full-year 5% intervention yields larger welfare gains (£1,489.09 million) but at a substantially higher fiscal cost (-£1,786.94 million), resulting in a lower BCR (0.83) and NPV of -£297.85 million.

Off-peak targeting improves proportional efficiency. The off-peak 12.5% VAT reduction (Nov-Mar) yields NPV_w gains of £234.14 million against an NPV_f loss of -£242.28 million, producing a BCR of 0.97 and an NPV of -£8.14 million, indicating near breakeven performance in welfare terms. Including the off-peak 5% scenario, NPV_w is £487.10 million against an NPV_f loss of -£538.92 million (BCR = 0.90; NPV = -£51.82 million), implying larger absolute gains but weaker proportional efficiency than off-peak 12.5%.

"Table III about here"

These results reinforce that VAT reductions can generate substantial welfare gains, but, under plausible behavioural assumptions, they do not self-finance. However, targeting relief to off-peak months materially improves welfare per pound of revenue foregone.

4.3.Labour Effects

Table IV reports the implied fiscal cost per job-year supported under each VAT policy scenario, expanded with turnover changes, job-years, and fiscal breakdowns for transparency. Under the full-year interventions, the cost per job-year is high, approximately £181,253 for the 12.5% cut and £191,788 for the 5% cut. This reflects the fact that VAT relief is a broad-based instrument that generates employment gains only through the share of tax reductions transmitted to prices and the resulting demand response. Accordingly, these values should not be interpreted as the budgetary cost of "purchasing" a job, but rather as a model-based efficiency metric capturing the revenue foregone per unit of employment supported.

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3 By contrast, off-peak targeting substantially improves employment cost-effectiveness. The off-
4 peak 12.5% policy implies a cost per job-year of approximately £84,529, while the off-peak
5 5% policy implies a cost per job-year of approximately £90,568. This improvement is
6 consistent with the paper's central mechanism: demand is more price-responsive in low-season
7 months, and capacity constraints are weaker. As a result, a greater share of the fiscal outlay
8 translates into incremental activity and labour demand rather than inframarginal transfers.
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20 21 **4.4.Sensitivity to Elasticity and Pass-Through** 22

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24 Because VAT reforms operate through consumer prices, their effectiveness depends critically
25 on both the absolute price elasticity of tourism demand ($|\varepsilon|$) and the degree of VAT price pass-
26 through (θ). Figure II presents a two-way sensitivity analysis that varies pass-through from 0.3
27 to 0.9 and elasticity from $|\varepsilon| = 1.0$ to 2.0, reported as 10-year NPVs (£m) across four VAT
28 policy designs: 12.5% full-year, 12.5% off-peak, 5% full-year, and 5% off-peak. Elasticity is
29 reported in absolute value for readability; in all calculations, we impose the standard negative
30 sign (i.e., $\varepsilon = -|\varepsilon|$), so larger $|\varepsilon|$ indicates stronger demand responsiveness.
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34 Across all four panels, outcomes improve monotonically as pass-through rises and demand
35 becomes more price-responsive, reflecting a stronger translation of the statutory VAT cut into
36 lower consumer prices and a larger quantity response. More generally, the off-peak
37 configurations shift the surface upward relative to the corresponding full-year designs,
38 indicating that concentrating relief in months with more price-sensitive demand improves
39 proportional efficiency.
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52 53 **4.5.Stochastic Uncertainty (Monte Carlo Simulation)** 54

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56 To complement the deterministic sensitivity tests, we ran a Monte Carlo simulation (5,000
57 draws) that jointly varies key behavioural parameters within the ranges reported in Table I.
58 Table V reports the resulting distributional summaries. The probabilistic results reinforce the
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deterministic pattern: under plausible joint parameter variation, year-round VAT cuts remain unlikely to reach breakeven performance, with mean BCRs below unity and relatively low probabilities of $BCR > 1$. By contrast, off-peak targeted VAT relief performs most robustly, with mean outcomes close to the full-year 12.5% case but at substantially lower fiscal cost, and with the highest proximity to breakeven performance under central parameter ranges. Overall, incorporating stochastic uncertainty does not overturn the policy ranking; it clarifies that the main conclusions are stable under realistic parameter uncertainty rather than dependent on a single set of point assumptions.

"Table V about here"

4.6. Integrated Scenario Comparisons

Table VI consolidates scenario comparisons across uniform year-round cuts and off-peak targeted relief. The results indicate that deeper VAT cuts generate larger absolute turnover and welfare gains but at disproportionately higher fiscal cost. In contrast, off-peak targeting increases proportional efficiency and limits fiscal exposure.

Under central assumptions, the off-peak 12.5% policy yields $BCR = 0.97$, substantially higher than the full-year 12.5% cut ($BCR = 0.88$), while increasing the fiscal NPV from $-\pounds 819.13$ million to $-\pounds 242.28$ million. The NPV (welfare plus fiscal) is correspondingly close to zero for off-peak 12.5% ($-\pounds 8.14$ million) relative to the full-year 12.5% cut ($-\pounds 97.85$ million). A similar pattern holds at the 5% rate: off-peak targeting improves the BCR (0.90 vs 0.83) but remains fiscally costly in net terms ($-\pounds 51.82$ million for off-peak 5%).

"Table VI about here"

4.7. Structural Sensitivity Analysis

To test whether the relative performance of off-peak VAT relief is robust to differences in destination structure, we vary two structural parameters that affect the scale and incidence of gains: seasonality intensity (the off-peak share of annual turnover, S_{off} , ranging from 0.20 to 0.45) and labour intensity (jobs supported per $\pounds 1$ m of tourism turnover, α , ranging from 16 to

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3 26). Figure III reports the resulting NPV (£m) for off-peak VAT at 12.5% and 5% under three
4 behavioural transmission regimes (low, mid, and high).
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8 Three patterns emerge. First, NPVs are negative across the full structural grid under all
9 transmission assumptions for both off-peak policies. Even though NPV improves
10 monotonically as s_{off} rises (a larger treated share of turnover) and as α increases (stronger
11 employment-linked feedbacks), the improvements are not sufficient to cross into positive
12 territory.
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18 Second, the structural gradients are consistent and intuitive in all panels. NPVs rise as s_{off}
19 rises and as α increases. This indicates that targeted VAT relief performs relatively better in
20 destinations with stronger off-peak seasonality (a greater scope for policy coverage) and higher
21 labour intensity (a greater translation of incremental turnover into job-years and associated
22 welfare/tax channels).
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28 Third, only under high-transmission assumptions does the 12.5% off-peak policy approach
29 break even; it remains negative across the tested structural range. In this regime, NPVs for off-
30 peak 12.5% improve markedly (approximately -39 to -11 £m) as both s_{off} and α increase,
31 while off-peak 5% remains clearly lower (-159 to -58 £m).
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36 Overall, Figure III reinforces the qualitative ranking in the main results. Off-peak 12.5%
37 consistently dominates off-peak 5% across plausible destination structures, and structural
38 advantages (higher s_{off} , higher α) reduce losses. However, these results do not overturn the
39 conclusion that deeper cuts require substantially stronger behavioural transmission to reach
40 positive net benefits within the explored parameter space.
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52 **4.8. Robustness Checks**

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55 To evaluate whether the policy ranking is sensitive to appraisal conventions and regional
56 economic structure, we conducted two robustness exercises. First, we varied the discount rate
57 (1.5%, 3.5%, 5%) and appraisal horizon (5, 10, 20 years). Second, we tested sensitivity to
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3 leakage in incremental visitor spending (0%, 20%, 40%), which reduces the extent to which
4 additional turnover translates into local wages/profits and related tax feedbacks. Across both
5 checks, the core conclusion remains unchanged: off-peak targeted VAT relief at 12.5% is
6 closest to breakeven under central assumptions, whereas uniform year-round cuts remain
7 materially below breakeven. The robustness table of results is reported in Appendix A (Tables
8 A1 and A2).
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14 4.8.1. *Discount rate and appraisal horizon*

16 Table A1 shows that longer horizons increase the absolute magnitudes of fiscal costs and
17 welfare gains, whereas higher discount rates reduce them. However, the policy ranking is
18 invariant across all combinations. BCRs are stable across scenarios because the welfare and
19 fiscal streams are scaled proportionally through the model's growth and discounting.
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26 4.8.2. *Leakage / local retention*

28 Table A2 varies the share of incremental spending that does not accrue locally (0-40%). Higher
29 leakage reduces wage/profit channels, thereby lowering welfare and tax feedbacks. Results
30 show that off-peak 12.5% is near breakeven at low leakage, becoming modestly negative at
31 higher leakage, while full-year cuts remain substantially below breakeven across all leakage
32 levels.
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41 5. Discussion

43 This study provides a regionally calibrated, behaviourally grounded welfare appraisal of
44 tourism VAT relief, explicitly comparing uniform VAT cuts with off-peak targeting. Across
45 the policy designs examined, the results consistently indicate that VAT relief can stimulate
46 tourism activity, but that its fiscal efficiency depends on behavioural transmission rather than
47 the statutory rate change alone. In particular, the analysis shows that off-peak targeting
48 improves proportional efficiency relative to uniform, year-round VAT reductions, supporting
49 the argument that policy timing and market conditions are central to the effectiveness of
50 tourism taxes. The expanded sensitivities reveal scenarios in which BCR improves under
51 optimistic assumptions, adding nuance to these trade-offs.
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3 Three findings stand out. First, uniform VAT reductions generate demand and employment
4 gains, but their effectiveness is attenuated because VAT changes do not translate one-for-one
5 into consumer prices. Since pass-through is incomplete, the consumer-price channel is weaker
6 than implied by the statutory rate reduction, which limits the magnitude of behavioural
7 response and helps explain why broad VAT relief is associated with substantial fiscal leakage
8 (Benzarti & Carloni, 2019; Benzarti et al., 2020; Crawford et al., 2010). Fiscal breakdowns in
9 the results further quantify this leakage, showing indirect tax offsets mitigate but do not
10 eliminate costs.

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18 Second, deeper VAT cuts amplify absolute demand effects but do not necessarily improve
19 proportional efficiency. This reflects a diminishing-returns logic: once the tax base exposed to
20 relief expands and fiscal losses compound, incremental demand gains may not scale
21 proportionately unless pass-through and demand responsiveness are unusually high. As a
22 result, "lower" VAT rates are not automatically "better" in welfare-per-cost terms, a point
23 consistent with wider evidence that tourism tax reforms involve trade-offs across
24 competitiveness, fiscal sustainability, and welfare outcomes (OECD, 2022; Rossello-Nadal &
25 Sard, 2026). However, exploratory panels indicate that in high-elasticity contexts, deeper cuts
26 can yield higher BCRs, suggesting conditional viability.

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34 Third, and most central to the paper's policy focus, off-peak targeting performs more strongly
35 in proportional terms than uniform annual relief. An off-peak VAT relief leverages slack
36 capacity and discretionary travel, thereby increasing the likelihood that tax relief translates into
37 incremental output rather than into inframarginal transfers. The behavioural rationale for why
38 off-peak targeting improves welfare efficiency is that it operates where the elasticity channel
39 is stronger and capacity constraints are weaker. In addition, job-year metrics and probabilistic
40 results reinforce this, with off-peak BCRs approaching 1 and lower job costs.

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48 The results align with a growing literature emphasising that VAT incidence and demand
49 heterogeneity are decisive for the outcomes of tourism tax reforms. In the hospitality and
50 tourism context, empirical work has documented partial pass-through and, in some cases,
51 asymmetric price adjustment (Benzarti & Carloni, 2019; Benzarti et al., 2020; Löwe, 2024). In
52 this setting, a uniform VAT cut spreads fiscal support across both peak and off-peak demand,
53 including periods when capacity is already heavily utilised and when visitor decisions may be
54 less price-responsive. This helps explain why uniform VAT relief can raise turnover while still
55 producing limited welfare-per-pound performance once fiscal costs are accounted for.
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3 By contrast, off-peak targeting is consistent with the tourism seasonality and capacity-
4 utilisation literature, which argues that interventions are more likely to be welfare-enhancing
5 when implemented in slack periods rather than during congested periods (Rossello-Nadal and
6 Sard, 2026; Stojčić et al., 2022). Off-peak months are typically characterised by under-utilised
7 accommodation stock, shorter opening hours, and weaker labour demand (Corluka, 2019;
8 Cuccia & Rizzo, 2011; Koenig-Lewis & Bischoff, 2005; Zhang et al., 2021). Under these
9 conditions, an incremental increase in demand is less likely to be crowded out and more likely
10 to translate into genuine additional activity, supporting the logic that targeting timing can
11 outperform increasing the generosity of a uniform tax cut. This interpretation is consistent with
12 the view that tourism policy instruments should be designed around temporal patterns and
13 destination constraints, rather than applied homogeneously across the year (Choe et al., 2019;
14 Dredge & Gyimóthy, 2017; Xie, 2020).

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25 The paper's main contribution is to move beyond "does VAT relief increase tourism activity?"
26 toward "which VAT design delivers the greatest welfare efficiency under realistic market
27 behaviour?". Methodologically, this is achieved by integrating (i) incomplete pass-through, (ii)
28 segment/season heterogeneity in demand response, and (iii) discounted welfare appraisal
29 within a single regional simulation framework. This responds directly to calls for more nuanced
30 and policy-design-sensitive approaches to tourism taxation that account for welfare trade-offs
31 and sustainability constraints (OECD, 2022; Rossello-Nadal & Sard, 2026).

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38 Substantively, the findings support a design principle: if VAT relief is used, it is more
39 defensible as a targeted, time-bound instrument focused on low-season conditions rather than
40 a uniform year-round subsidy. In destinations with pronounced seasonality and a
41 predominantly domestic leisure market, such as Dorset, off-peak targeting is especially relevant
42 because it aims to shift and stimulate consumption where spare capacity exists, rather than
43 subsidising already strong peak demand.

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50 Beyond economic and welfare efficiency, off-peak VAT targeting holds potential benefits for
51 broader tourism sustainability. By shifting demand toward low-season months when capacity
52 is under-utilised, the policy could alleviate peak-period congestion and associated
53 environmental pressures, such as increased traffic, resource strain, and habitat disruption,
54 especially in sensitive coastal and rural areas. This aligns with calls for taxation designs that
55 promote sustainable destination management (Rossello-Nadal & Sard, 2026), as targeted relief
56 encourages more balanced visitor flows without subsidising already high-demand periods.
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3 Socially, it could support more stable year-round employment in SMEs, reducing seasonal
4 layoffs and enhancing community resilience. While the model does not quantify environmental
5 externalities, the improved BCR and lower fiscal costs of off-peak scenarios suggest they offer
6 a more sustainable fiscal footprint than uniform cuts, providing a pathway to reconcile demand
7 stimulation with long-term environmental and social objectives.
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13 The results implies that debates about tourism VAT should focus less on headline rates and
14 more on implementation design and behavioural transmission. Specifically, time-bounded,
15 conditional, and targeted policies during periods of slack capacity are more likely to deliver
16 welfare-efficient outcomes than permanent, uniform reductions. This also suggests that
17 monitoring pass-through in the sector is crucial, because the consumer-price channel is the
18 primary mechanism through which VAT reforms generate welfare gains. Weak pass-through
19 undermines effectiveness and increases the likelihood that benefits accrue as producer rents
20 rather than consumer gains (Benzarti & Carloni, 2019; Löwe, 2024).
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31 **6. Conclusion**

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34 This study develops and applies a regionally calibrated behavioural cost-benefit framework to
35 assess the fiscal, employment and welfare implications of tourism VAT relief. The central
36 contribution is to show that the net efficiency of VAT reductions is shaped by the interaction
37 of tax incidence, price transmission, behavioural responsiveness, and destination structure,
38 particularly seasonality and labour intensity. Under central parameters, VAT cuts raise turnover
39 and welfare but are typically offset by larger reductions in public revenues, resulting in negative
40 NPVs over time. The results also indicate that tax policy design, rather than the depth of tax
41 cuts, dominates the depth of tax cuts.
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49 While calibrated to Dorset, the findings generalise to other destinations because the
50 mechanisms modelled are common features of tourism economies. The framework is
51 parameterised and modular, allowing recalibration using local turnover, seasonal shares,
52 employment intensity, and evidence-based ranges for pass-through and elasticity without
53 altering the underlying economic logic. The comparative insight is therefore transferable.
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57 Where seasonality is pronounced and spare capacity is material outside peak periods, targeted
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3 relief is more likely to outperform uniform reductions. Whereas, where pass-through is weak,
4 fiscal costs dominate even when turnover rises.
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8 From a sustainability perspective, these fiscal instruments support tourism development most
9 credibly when aligned with resilience rather than peak-volume expansion. Off-peak targeting
10 can contribute to more stable employment and reduced seasonal precarity, supporting decent
11 work and inclusive local growth. It can also ease peak-period pressures on infrastructure and
12 local amenities by shifting demand temporally, which is consistent with more sustainable
13 destination management and responsible consumption. These links are conditional on
14 complementary measures that steer any stimulus toward quality, productivity and lower-impact
15 tourism.
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22 23 **6.1. Implications for policy and practice** 24

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26 For national policymakers, the results point to three priorities. The first is targeting relief to
27 periods and segments where discretionary demand is more price responsive and capacity
28 constraints are weaker. The second is governance of transmission through monitoring of price
29 behaviour in key sub-sectors, supported by clear expectations about pass-through. The third is
30 credible exit design through sunset clauses and evaluation triggers to reduce fiscal lock-in. To
31 strengthen alignment with sustainability goals, targeted relief can be paired with
32 complementary programmes that encourage productivity-enhancing, low-carbon investments,
33 such as energy efficiency upgrades, workforce development, and digital capability, thereby
34 translating temporary liquidity into longer-run resilience.
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42 For local authorities and destination management organisations, VAT relief is most likely to
43 generate incremental visits when embedded in an off-peak strategy that reduces frictions.
44 Coordinated event calendars, shoulder-season marketing, and improved off-peak accessibility
45 and packaging across accommodation and attractions can increase the likelihood that price
46 changes translate into additional trips. Such coordination can also help avoid intensifying peak
47 congestion and can support more balanced spatial and temporal patterns of visitation.
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53 For businesses, the welfare case improves when relief is used to stimulate demand through
54 visible pricing, product bundles and targeted off-peak offers rather than being absorbed
55 primarily as margin. Where relief is time-bound, improved cash flow provides a window to
56 strengthen operational resilience through workforce retention, service quality improvements,
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3 energy efficiency and digital distribution. Collective coordination and transparent pricing can
4 also reduce fragmented responses, thereby weakening pass-through and diluting the aggregate
5 demand effect.
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9 For residents and the local workforce, the most defensible benefits arise from smoothing
10 seasonal volatility rather than expanding peak volumes. Off-peak targeting can support
11 community welfare by contributing to more predictable hours and improved employment
12 stability, reinforcing the decent work dimension of sustainable tourism.
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16 17 **6.2.Limitations and future research**

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19 This analysis is an ex-ante, partial-equilibrium simulation intended for policy comparison
20 rather than causal inference. Therefore, results remain sensitive to behavioural assumptions
21 about pass-through and elasticity, and the framework abstracts from broader adjustments, such
22 as cross-destination substitution, input-price responses, and macroeconomic feedbacks. In
23 addition, the model does not explicitly quantify temporal substitution between peak and off-
24 peak periods, nor does it incorporate environmental externalities or capacity constraints that
25 may bind in high-season contexts. Finally, external validity depends on destination structure,
26 although the model is transferable because it relies on observable inputs and evidence-based
27 behavioural ranges.
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37 Future research could estimate pass-through more precisely across tourism sub-sectors and firm
38 types using quasi-experimental evidence, measure temporal substitution and net new trip
39 creation, extend the framework to distributional impacts across households, workers and firm
40 size, and integrate environmental and congestion externalities to assess how VAT design
41 interacts with low-carbon transitions and destination resilience.
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49 **Appendix A.**

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51 Tables A1 and A2 provide supplementary material referenced in the main text and are
52 included here for transparency and completeness.
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55 *"Table A1 about here"*

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57 *"Table A2 about here"*
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Tourism Review

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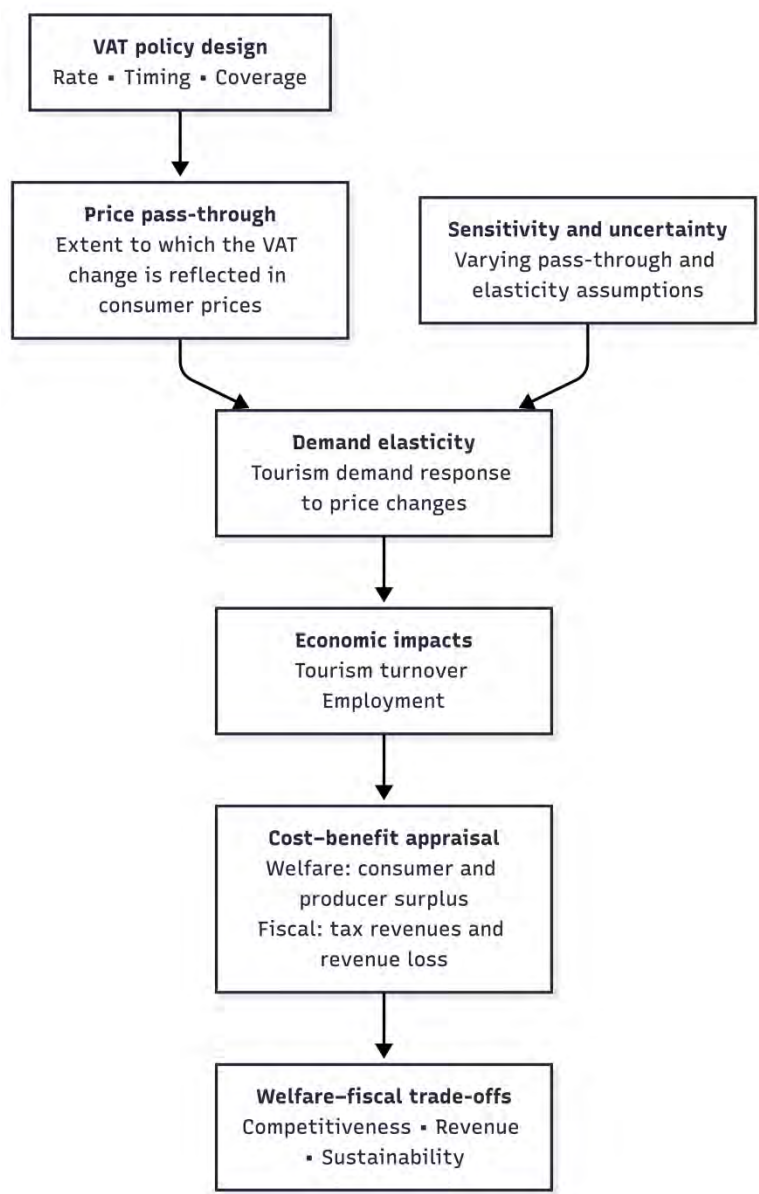


Figure I. Conceptual Framework

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VAT 12.5% (full-year)

0.9	37.1	99.6	162.8	226.8	291.5	356.9
0.8	-66.3	-11.5	43.8	99.8	156.2	213.3
0.7	-168.9	-121.6	-74.0	-25.8	22.7	71.7
0.6	-270.8	-230.9	-190.6	-150.1	-109.2	-68.0
0.5	-372.1	-339.2	-306.2	-273.0	-239.5	-205.8
0.4	-472.6	-446.7	-420.7	-394.6	-368.3	-341.8
0.3	-572.5	-553.4	-534.2	-514.9	-495.5	-476.0

VAT 12.5% (off-peak)

11.7	31.4	51.3	71.4	91.8	112.4
-20.9	-3.6	13.8	31.4	49.2	67.2
-53.2	-38.3	-23.3	-8.1	7.2	22.6
-85.3	-72.7	-60.0	-47.3	-34.4	-21.4
-117.2	-106.9	-96.5	-86.0	-75.4	-64.8
-148.9	-140.7	-132.5	-124.3	-116.0	-107.7
-180.4	-174.3	-168.3	-162.2	-156.1	-150.0

VAT 5% (full-year)

9.1	127.5	248.7	372.8	499.9	630.1
-210.9	-109.2	-5.3	100.8	209.2	319.8
-427.6	-341.5	-253.8	-164.5	-73.6	19.1
-641.0	-569.7	-497.2	-423.5	-348.7	-272.8
-851.4	-793.8	-735.6	-676.5	-616.7	-556.1
-1058.8	-1014.2	-969.2	-923.8	-877.8	-831.4
-1263.3	-1231.0	-1198.4	-1165.6	-1132.5	-1099.2

VAT 5% (off-peak)

2.9	40.1	78.3	117.4	157.5	198.5
-66.4	-34.4	-1.7	31.8	65.9	100.8
-134.7	-107.6	-80.0	-51.8	-23.2	6.0
-201.9	-179.4	-156.6	-133.4	-109.8	-85.9
-268.2	-250.1	-231.7	-213.1	-194.3	-175.2
-333.5	-319.5	-305.3	-291.0	-276.5	-261.9
-398.0	-387.8	-377.5	-367.2	-356.7	-346.2

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Elasticity (|ε|)

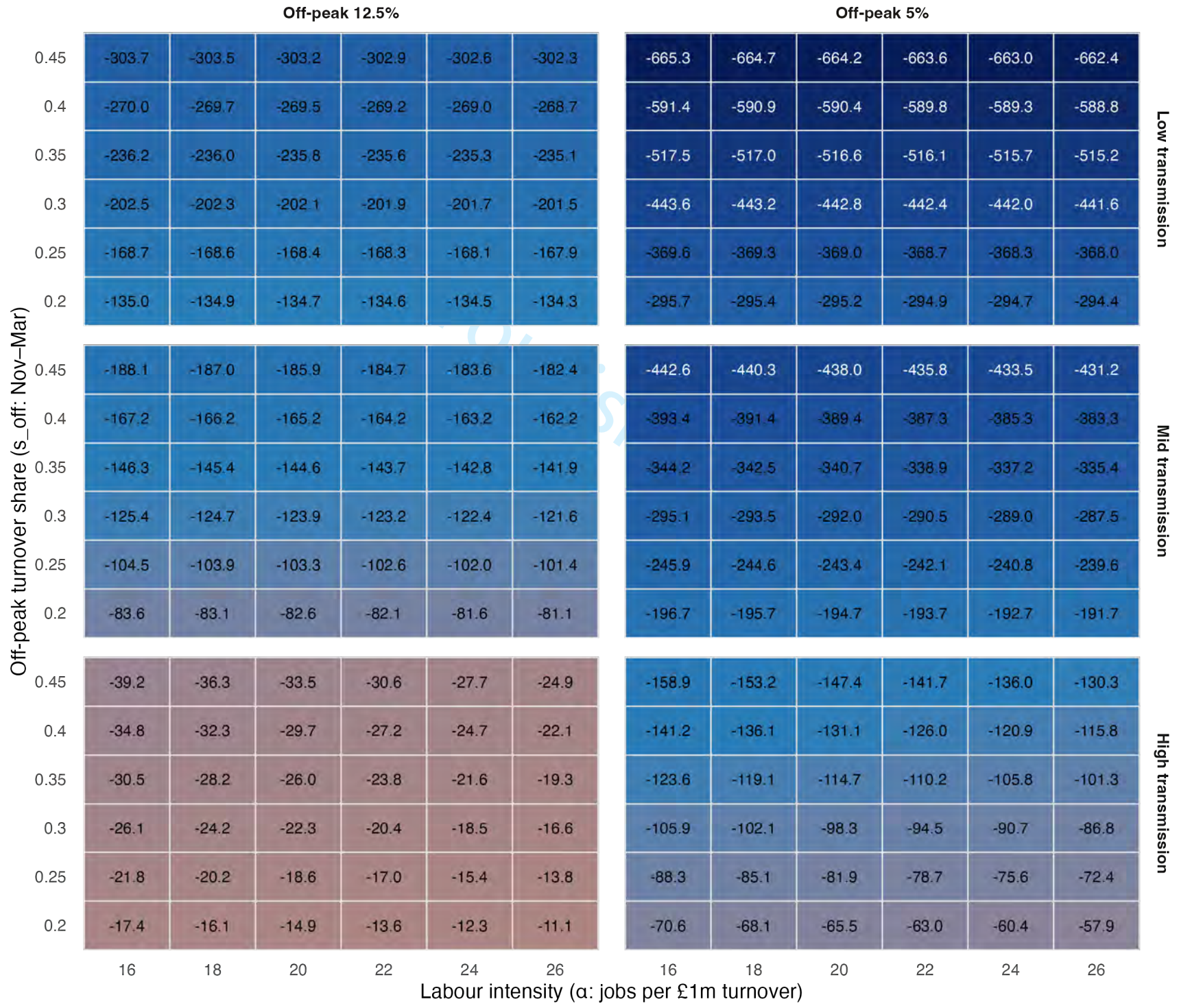


Table I. Model parameters and calibration

Parameter	Definition	Value(s)	Source(s)	Calibration rationale
T_0	Baseline annual tourism turnover in Dorset (£m)	£1,704m	South West Research Company (2024); VisitEngland (2023)	Baseline calibrated to the most recent regional tourism accounts for Dorset; reference level for all scenarios.
r_0	Baseline VAT rate on tourism services	20%	HMRC (2023)	Statutory UK VAT rate during baseline period.
r_1	Reduced VAT rate (policy)	12.5%; 5%	HM Treasury (2022); OECD (2022)	(i) UK pandemic-era reduced rate (12.5%); (ii) stylised EU-style reduced tourism rate (5%).
θ	VAT price pass-through rate	0.7 (central); 0.3-0.9 (Robustness tests)	Benzarti & Carloni (2019); Benzarti et al. (2020); Crawford et al. (2010); Onnis et al., (2025).	Captures incomplete pass-through documented for hospitality; explored widely to reflect market structure and competition conditions.
ε	Price elasticity of tourism demand (annual)	-1.3	Crouch (1996); Song et al. (2010); Peng et al. (2015); Falk & Lin (2018); Rossello-Nadal & Santana-Gallego (2022)	Elasticity anchored in tourism-specific literature for discretionary leisure demand; reflects average annual responsiveness rather than peak-season behaviour.
ε_{off}	Price elasticity of tourism demand (off-peak)	-1.6 (central)	Falk & Lin (2018); Wardman (2022)	Off-peak demand assumed more price elastic due to excess capacity and discretionary travel timing; applied only to off-peak policy blocks.
c	Coverage share of turnover under VAT reduction	100% (full-year); $c = s_{off}$ for off-peak policies	Authors' calibration; VisitEngland (2023); South West Research Company (2024)	Allows temporary/partial-year representation; off-peak policies treat only the Nov-Mar turnover share.
s_{off}	Share of annual turnover occurring off-peak (Nov-Mar)	31.5% (central); 20%-45% (Robustness tests)	VisitEngland (2023); South West Research Company (2024)	Central value derived from Dorset seasonality; range used for structural sensitivity across destinations with different seasonality intensity.
μ	Operating profit margin in tourism	8% (central); 5%-12% (Robustness tests)	ONS (2023a); UKHospitality (2023b)	Reflects the low-margin structure of accommodation/hospitality SMEs; alternatives are used for robustness when margin

Parameter	Definition	Value(s)	Source(s)	Calibration rationale
				affects producer surplus and tax offsets.
ω	Labour share of tourism turnover	0.32	ONS Tourism Satellite Account (2023b)	Used to approximate wage-linked tax feedbacks from turnover changes.
α	Employment intensity (jobs per £1m turnover)	21.4 (central); 16-26 (Robustness tests)	ONS (2023a); WTTC (2025)	Calibrated to the Dorset employment-to-turnover ratio; range used to test labour intensity across different destination structures.
τ_c	Corporate tax rate	25%	HMRC (2023)	Statutory UK corporation tax rate used to model profit-tax offsets.
$\tau_i + \tau_e$	Combined labour tax rate (income tax + NICs)	32%	HM Treasury (2023)	Effective combined rate applied to wage share for labour tax offsets.
g	Real annual growth rate of tourism turnover	1.5%	VisitBritain (2023); OECD (2023)	Conservative long-run real growth for a mature destination; used in multi-year projections.
δ	Social discount rate	3.5% (central); 1.5%-5.0% (Robustness tests)	HM Treasury Green Book (2022)	Baseline UK public-sector discount rate; varied to test sensitivity to appraisal conventions.
m_1	Employment multiplier (Type I/II)	Applied (sectoral multiplier)	ONS Input-Output Tables (2023c)	Captures indirect/induced employment effects in supply chains where included.

Table II: First-Year Effects of VAT Reduction Scenarios (Central Parameters)

Scenario	Δ Turnover (£m)	Δ Jobs (FTE)	Δ Gov (£m)	Δ Welfare (£m)
Full-year 12.5%	23.02	492.70	-89.29	78.62
Full-year 5%	47.46	1015.60	-194.79	162.32
Off-peak 12.5%	14.60	312.49	-26.41	25.52
Off-peak 5%	30.31	648.74	-58.75	53.10

Notes: Off-peak scenarios apply the reduced VAT rate only to Nov-Mar turnover share (31.5%) and set $\varepsilon_{\text{off}} = -1.6$; full-year scenarios set $\varepsilon = -1.3$. Pass-through is $\theta = 0.7$. FTE represent model-implied employment supported, derived from turnover changes and employment intensity; they should be interpreted as an indicator of employment impact rather than a direct measure of net new hires.

Table III: Ten-Year NPVs of Fiscal and Welfare Impacts (Central Parameters)

Scenario	NPV _f (£m)	NPV _w (£m)	NPV (£m)	BCR
Full-year 12.5%	-819.13	721.28	-97.85	0.88
Full-year 5%	-1786.94	1489.09	-297.85	0.83
Off-peak 12.5%	-242.28	234.14	-8.14	0.97
Off-peak 5%	-538.92	487.10	-51.82	0.90

Notes: Off-peak scenarios use $\varepsilon_{\text{off}} = -1.6$; full-year scenarios use $\varepsilon = -1.3$. Discounting and growth follow the paper's baseline settings (social discount 3.5%, real growth 1.5%). BCR computed as 10-year PV welfare gains divided by 10-year PV fiscal cost (absolute value).

Table IV: Fiscal Cost per Job-Year

Scenario	NPV Turnover Change (£m)	Job-Years Supported	Direct VAT Loss (£m)	Indirect Tax Add-Backs (£m)	Total Fiscal Cost (£m)	Fiscal Cost per Job-Year (£)
Full-year 12.5%	211.22	4521.11	-1034.56	215.43	-819.13	181,253
Full-year 5%	435.62	9322.27	-2254.32	467.38	-1786.94	191,788
Off-peak 12.5%	134.00	2867.60	-305.78	63.50	-242.28	84,529
Off-peak 5%	278.25	5954.55	-680.45	141.53	-538.92	90,568

Notes: Job-years represent model-implied employment supported, derived from turnover changes and employment intensity (21.4 jobs per £1m); they should be interpreted as an indicator of employment impact rather than a direct measure of net new hires. Costs are in £ per job-year over 10 years, discounted at 3.5% with a 1.5% growth rate. Fiscal breakdown shows direct VAT revenue loss offset by indirect taxes (labour at 32% of turnover, corporate at 25% of 8% profit margin).

Table V: Monte Carlo Results (5,000 Draws)

Metric	Value
Full-Year 12.5%	
Mean BCR	0.82
Median BCR	0.81

Metric	Value
Full-Year 12.5%	
SD BCR	0.21
P05	0.52
P95	1.16
Off-Peak 12.5% (Expanded for Informativeness)	
Mean BCR	0.98
Median BCR	0.97
SD BCR	0.15
P05	0.75
P95	1.25

Notes: Probabilistic sensitivities (e.g., mean/median BCR, distributions) via 5,000 simulations. Parameters randomised: $\theta \sim \text{uniform}(0.3, 0.9)$, $\varepsilon \sim \text{normal}(\text{mean}=-1.3, \text{sd}=0.2)$ for full-year; similar for off-peak with $\varepsilon_{\text{off}} = -1.6$ base. Expanded to show for full-year 12.5% (base) and off-peak 12.5% (for comparison).

Table VI: Policy Comparison: Full-Year vs Off-Peak VAT Relief

Scenario	NPV _f (£m)	NPV _w (£m)	NPV (£m)	BCR	Coverage
Full-year 12.5%	-819.13	721.28	-97.85	0.88	1.000
Full-year 5%	-1786.94	1489.09	-297.85	0.83	1.000
Off-peak 12.5%	-242.28	234.14	-8.14	0.97	0.315
Off-peak 5%	-538.92	487.10	-51.82	0.90	0.315

Notes: "Coverage" refers to the share of annual turnover receiving the reduced VAT rate (Nov-Mar share = 31.5%). Off-peak policies apply $\varepsilon_{\text{off}} = -1.6$; full-year policies use $\varepsilon = -1.3$.

Table A1: Robustness to Discount Rate and Appraisal Horizon (Central Behavioural Assumptions)

	δ	Horizon	NPV Fiscal (£m)	NPV Welfare (£m)	BCR
<i>Full-year</i>					
<i>VAT rate = 12.5%</i>					
	1.5%	5	-445.98	392.85	0.88
		10	-892.67	786.41	0.88
		20	-1785.35	1572.82	0.88
	3.5%	5	-429.65	378.49	0.88
		10	-819.13	721.28	0.88
		20	-1493.05	1315.36	0.88
	5%	5	-418.04	368.34	0.88
		10	-770.11	678.30	0.88
		20	-1318.67	1161.77	0.88

δ	Horizon	NPV Fiscal (£m)	NPV Welfare (£m)	BCR
Full-year				
VAT rate = 5%				
1.5%	5	-973.78	811.59	0.83
	10	-1948.31	1624.05	0.83
	20	-3896.62	3248.09	0.83
3.5%	5	-937.74	781.60	0.83
	10	-1786.94	1489.09	0.83
	20	-3257.45	2714.88	0.83
5%	5	-912.53	760.61	0.83
	10	-1680.27	1400.41	0.83
	20	-2876.70	2397.69	0.83
Off-peak				
VAT rate = 12.5%				
1.5%	5	-128.78	124.48	0.97
	10	-257.80	249.17	0.97
	20	-515.60	498.34	0.97
3.5%	5	-124.07	119.95	0.97
	10	-242.28	234.14	0.97
	20	-441.47	426.78	0.97
5%	5	-120.74	116.73	0.97
	10	-222.41	215.03	0.97
	20	-380.92	368.30	0.97
Off-peak				
VAT rate = 5%				
1.5%	5	-284.45	257.05	0.90
	10	-569.43	514.66	0.90
	20	-1138.86	1029.32	0.90
3.5%	5	-274.06	247.63	0.90
	10	-538.92	487.10	0.90
	20	-982.99	888.33	0.90
5%	5	-266.49	240.81	0.90
	10	-490.78	443.59	0.90
	20	-840.74	759.83	0.90

Notes: Off-peak scenarios use $\epsilon_{\text{off}} = -1.6$; full-year scenarios use $\epsilon = -1.3$. Varies discount rates (1.5%, 3.5%, 5.0%) and horizons (5, 10, 20 years); central behavioural assumptions ($\theta = 0.7$, no leakage). Lower discounts or longer horizons amplify absolute NPVs but preserve BCR.

Table A2: Robustness to Leakage (Central Behavioural Assumptions)

Policy	Leakage	NPV Fiscal (£m)	NPV Welfare (£m)	BCR
Full-year				
VAT rate = 12.5%				
	0	-819.13	721.28	0.88
	20%	-824.30	717.90	0.87
	40%	-829.47	714.52	0.86
Full-year				
VAT rate = 5%				
	0	-1786.94	1489.09	0.83
	20%	-1797.60	1482.13	0.82
	40%	-1808.26	1475.16	0.82
Off-peak				
VAT rate = 12.5%				
	0	-242.28	234.14	0.97
	20%	-245.56	232.00	0.94
	40%	-248.84	229.85	0.92
Off-peak				
VAT rate = 5%				
	0	-538.92	487.10	0.90
	20%	-545.73	482.65	0.88
	40%	-552.54	478.20	0.87

Notes: Leakage applies to incremental local wage/profit channels (and associated tax feedbacks) linked to additional turnover; VAT receipts are modelled on total spending (not scaled by leakage). Central behavioural assumptions ($\theta = 0.7$). Higher leakage reduces indirect offsets and producer surplus, lowering BCR.