

The Potential Economic & Greenhouse Gas Impacts of a Visitor Levy in Wales

Calvin Jones

Cardiff Business School & Welsh Government

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1 Introduction & Overview

This document summarises the approach to estimating the economic and greenhouse gas emissions (GHG) impact of the proposed Visitor Levy in Wales. We estimate the potential economic impact of the Levy by drawing on academic and other literature that suggests a range of potential visitor responses, and then use a bespoke regional economic account for Wales – the *Input Output Tables for Wales (IOTW)* – to translate changed visitor volumes into an economic ‘shock’¹ on the regional economy. Input-Output Tables (IOTs) describe the sale and purchase relationships between producers and consumers within an economy. They are one of a number of methodologies used to estimate the whole-economy impact of changes in economic conditions. The IOT method of modelling the economy allows reporting of key economic outcomes, including on disposable income, Gross Value Added (GVA), and employment, both directly in the affected sectors (here transport, hospitality, recreation etc.) and indirectly, through regional supply chains and wage effects. The IOTs also allow an estimation of the GHG impacts of changes in the number of visitors to Wales, and these are also reported.

The IOTs for Wales have been compiled and published by Cardiff University’s Business School for 25 years, paralleling similar economic accounting approaches undertaken by the Office for National Statistics (ONS) for the UK, by Scottish Government, and latterly in Northern Ireland. The current iteration covers base-year 2019. This is the most recent year for which all relevant data were available when the tables were compiled (in early 2022), and hence the latest possible – and additionally avoids significant pandemic disruptions to both behaviours and data collection. The Tables lever all relevant publicly available (largely ONS and Welsh Government) information for their compilation².

Input-Output Tables have been used extensively for economic impact, policy, and evaluative analysis by a wide range of public, third sector and private bodies in many countries. The IOTW meanwhile are the most holistic and detailed picture of the Welsh economy. The Welsh Government is currently undertaking an analysis of the feasibility of compiling and publishing ‘official’ Input Output Tables for Wales, with an experimental IOT for Wales expected to be published in mid-2024.

As part of the Cardiff University project, the IOTW have been iteratively extended to better reflect visitor expenditures (which do not affect a single sector, but many parts of the regional economy). The resulting Tourism Satellite Accounts (TSA) and Tourism Impact Model have also been important parts of policy analysis in Wales and inform this current work.

The next section reports on the structural adjustments made to the IOTW to better reflect the impact of the Levy and our methodology and assumptions. Note that **none of the analyses presented in this report include any frictional or administrative costs that any new Levy might engender**. These costs are currently unknown, in terms of both their scale and nature.

¹ An economic ‘shock’ refers to any change to fundamental economic variables or relationships that has a substantial effect on economic outcomes and measures of economic performance, such as employment or value-added.

² Fuller detail on the methodology and data for IOTW is available at <https://orca.cardiff.ac.uk/id/eprint/151984/> and from the current author.

2 Data & Methodology

2.1 Key Data

Our methodology (2.2 following) depends critically on several key data sources covering tourism in Wales, typically relating to 2019 as this is our base year of analysis.

1. **The Great Britain Tourism Survey 2019** – Published for Wales by Welsh Government³, this is the last edition of the longstanding domestic staying visitor survey⁴, covering destination type, accommodation used, transport types used, money spent during visits and the profile of visitors. This survey is used directly to estimate volumes, overall expenditure and (following manipulation) expenditure on commodities in Wales, and transport costs to Wales. Note the GBTS did not cover international or daytrip visits.
2. **The International Passenger Survey/Travel Trends**⁵ – This provides annual estimates of travel and tourism visits to the UK of less than 12 months' duration, and associated earnings and expenditure between the UK and the rest of the world. It should be noted this includes *all* travel, including elements that are not relevant to staying tourism (such as overseas day trips and some work purposes). Further, information on the commodities purchased by visitors has not been published for some time, and expenditure by region is available for all trip-types only. It should be noted that the IPS *does not collect information on the cost of international travel*, meaning it is not consistent with the GBTS in ways that are important for our analysis (see Page 10).
3. **The UK Input Output Tables 2019**⁶ and **Input-Output Tables for Wales 2019**⁷ – Provide 'framing' information and fill some gaps, e.g. on commodity expenditure. The latter are of course instrumental in our modelling analysis.

Other data sources and approaches are used throughout, and these are detailed at the appropriate juncture in the following methodological and analytical sections.

2.2 Framing The Accommodation Supply Side

The IOTW for 2019 are published by 64 industrial sectors, following an ONS-established structure that corresponds (roughly) to 2-digit Standard industrial classification of economic activities codes (SIC). This structure is however unhelpful for Visitor Levy analysis, as it conflates accommodation and food service industries. Prior to analysis we therefore restructure the IOTW

³ <https://www.gov.wales/great-britain-tourism-survey-2019>

⁴ For the new integrated survey with a wider range of data collection approaches see <https://www.gov.wales/domestic-gb-tourism-statistics>

⁵ <https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/articles/traveltrends/2019>

⁶

<https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/ukinputoutputanalyticaltablesindustrybyindustry>

⁷ <https://orca.cardiff.ac.uk/id/eprint/151984/>

by splitting this sector into three; *Hotels etc. (SIC2007 55.1)*; *Other accommodation (55.2-55.9)* and *Food and beverage service activities (56)*⁸.

This enables a far more precise rendering of any economic 'shock' but is not straightforward. For example, the ONS does not report components of regional GVA for SICs 55 and 56 separately, and other methods (such as splitting the sector by employment share) are inappropriate given varying levels of self-employment and output per worker. Our approach is broadly thus as follows:

- The three new classes (55.1, 55.2-55.9 and 56) sum to relevant existing cells in the IOTW for 2019 (e.g. for total output, GVA, compensation of employees⁹ and GHG emissions).
- Proportions of GVA, Output, Mixed income¹⁰ and Compensation of Employees are divided between SICs 55 and 56 with reference to variables from the ONS published non-financial business economy, UK regional results for 2019¹¹ (inc. *Turnover, approximate GVA, Employment costs, total purchases of goods, services & materials*).
- Further disaggregation of key financial indicators into 55.1 and 55.2-55.9 is undertaken with reference to the 2007 *Input-Output Tables for Wales* and 2013 *Tourism Satellite Account for Wales*, weighted by relative changes in the shares of Business Register and Employment (BRES)-reported employment from 2009¹² - 2019¹³
- Purchases of intermediate products are divided by ratios described in prior IOTs and TSAs for Wales and with reference to TSAs from other polities.
- Workforce employment from IOTW is divided according to the ratios reported in the 2007 IOTs, weighted by the relative change in the 2019 BRES 3-digit FTE employment estimates for 2009-2019.
- GHG emissions are subdivided according to estimated sub-sector output.

The above approach is far from perfect. For example, it assumes that the ratios of GVA and output per worker within the hotel and other accommodation sectors have remained the same since 2007, with these then informing our split of financial variables. We also lack detailed and up to date information on the workforce (employees + self-employed) within our subsectors. Nonetheless, undertaking this imperfect disaggregation is superior to assessing the impact of the Visitor Levy based on a single Division / Accommodation & food service sector.

⁸ Note that there are insufficient data to split the accommodation sector any further, or along the lines suggested for Levy Bands.

⁹ Compensation of Employees is the total remuneration payable to employees in cash or in kind. Includes the value of social contributions payable by the employer.

¹⁰ Mixed income is the operating profit of unincorporated businesses owned by households. Household members often provide unpaid labour inputs to the business. The profit is therefore a mixture of labour remuneration and return to the owner as entrepreneur.

¹¹

<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/datasets/uknonfinancialbusinesseconomyannualbusinesssurveyregionalresultssectionsas>

¹² The earliest available

¹³ See www.nomisweb.co.uk

We thus are presented with a 66-Sector IOT with additional detail for accommodation and food service covering differences in GVA, output, employment and mixed income, and the level of intermediate purchases¹⁴.

2.3 Estimating Baseline Visitor Demand

The prior section describes how we restructure our ‘Welsh tourism supply side’ to better reflect the impact of the Visitor Levy. A similar process is required on the *demand* side – to subdivide visitor consumption between our three new sectors, (the IOTW only reporting visitor consumption across the wider accommodation and food service sector). Here we refer to data collected via the *GB Tourism Survey (GBTS)*, with the Welsh Government producing and publishing the relevant data for Wales¹⁵.

The data include estimates of total trips, nights, and spending of domestic visitors in 2019 and this is split by commodity purchased, allowing a reasonably robust estimate of spending on accommodation by visitors to Wales¹⁶. The survey methodology does not however enable an estimate of accommodation spending by the type of facility we are looking to reveal here – firstly, hotels and B&Bs and secondly self-catering, camping, caravanning and other accommodation. Information on expenditure is not publicly available for this split.

Separately, however, the *Visit Wales Accommodation Occupancy Survey Annual Report 2019*¹⁷ provides an estimate of annual average daily rate (ADR) for hotels. This average rate (around £67) is multiplied by the total number of visitor nights in Wales in hotels and B&Bs. We then estimate average room occupancy by the weighted average (by nights) in Wales of room nights spent by one- and two-person parties (hence 1.66 persons per room-night in 2019). Dividing our estimated aggregate revenue per room by occupancy provides an adjusted estimate for total income in hotels and similar accommodation (gross of VAT etc.) of around £315m in 2019. By remainder from the aggregate results in the GBTS we estimate income to other commercial accommodations at £505m.

This method is (again) imperfect. Firstly, we are combining two different surveys and datasets with different respondents, methods, and purposes, leading to possible inconsistencies. Secondly, ADR is not available for serviced B&B/guest house accommodation, and we are applying the hotel average to nights spend in such facilities, leading to a possible overestimate of income accruing to SIC 55.1. This notwithstanding, we estimate that the 32.8% of commercial-accommodation visitor nights spent in hotels etc. in Wales results in the accrual of 38.5% of wider sector revenue (i.e., a person-night in serviced accommodation is rather more expensive than a person-night in other accommodation, around £40 versus £32).

¹⁴ Note the regional purchasing propensity for individual products will not vary between our new subsectors, but the proportions of product purchase in overall purchases will.

¹⁵ <https://www.gov.wales/great-britain-tourism-survey-2019>

¹⁶ Note this includes all visitor purposes, including business and visiting friends & relatives.

¹⁷ https://www.gov.wales/sites/default/files/statistics-and-research/2021-01/wales-accommodation-occupancy-survey-2019_0.pdf

The IOTW report a total expenditure on accommodation and serviced food, in basic prices¹⁸, of around £900m by British residents visiting Wales, and this expenditure is split across our new three sub-sectors using the approach derived above. Note that as there is almost no information available on the commodity spending of overseas visitors to Wales¹⁹, we apply the same proportions to (much smaller) spending by overseas visitors in Wales reported in *Travel Trends*.

2.4 Balancing the New Input-Output Table

Note that the above approach to estimating supply and demand by discrete tourism product requires that demand equals supply for each (this compiling a 'symmetrical' IO table that allows multiplier analysis). As the demand and supply estimation is undertaken using different data sources, this does not occur as a matter of course. We thus require the table to be rebalanced – consumption or supply to be adjusted between each of our new visitor classifications (but keeping overall hospitality supply and demand consistent with 2019 aggregates).

Typically, this might be done using an algorithmic approach that minimises adjustments to rows (demand) and columns (supply) but we have here made that adjustment based on our judgement of the relative quality of relevant data sources²⁰.

2.5 Introducing the Visitor Levy as a Demand Shock

Following the above analyses, we now have a 'balanced' estimate of supply and demand in Wales for three hospitality sectors, placed within the wider IOTW. This allows a more sophisticated approach to assessing the impact of a Visitor Levy (VL). To make the estimation tractable, a suite of assumptions is required given the analytical structure and data availability:

1. The VL is either (a) passed on to visitors by businesses in total or (b) absorbed fully in business costs.
2. Where the cost is passed on, there will be behavioural changes as visitors react to increased holiday costs and change the likelihood of visiting Wales at the margin – and that this response will be proportional to the level of increased cost.
3. The likelihood of visitor response in the Welsh case is included in the universe of existing estimates of visitor price elasticity of demand (PED) in the report for the Welsh Government undertaken by Alma Economics in 2022²¹. Note that this meta-analysis reports PEDs from thirty studies, which can be used in concert to estimate PED for tourism in Wales.
4. *The VL is applied across all Welsh Local Authorities – and any visitors who amend their trips will wholly avoid Wales.*
5. The rate is set, exclusive of VAT, at £1.25 per person-night for most commercial accommodation (here titled Band 1) but with campsites and hostels (here Band 2) subject to a lower charge of £0.75.

¹⁸ Net of directly imported goods, VAT & margins, and so not comparable to earlier figures

¹⁹ Or indeed to the UK more generally.

²⁰ Detail available from author.

²¹ See <https://www.gov.wales/sites/default/files/statistics-and-research/2022-09/evidence-review-of-elasticities-relevant-to-a-visitor-levy-in-wales-331.pdf>

6. They levy is however charged gross of VAT which is then transferred to the UK Government (and is not modelled in our regional multiplier analysis). There is not yet clarity on whether UK Government will charge (and retain) VAT, but the view of Welsh Treasury is that this is very likely (albeit a decision for HM Government in London).

These assumptions clearly mean that our approach is only indicative of likely future behaviours and outcomes – for example for (4), if only a subset of tourism-intense Local Authorities impose such a levy, visitors may visit other parts of Wales as a result, meaning far lower ‘net national’ economic losses. Without, however any data on either the relevant behaviours or the likelihood of Levy imposition across Wales, we cannot present a simulation of these more complex cases. Calculating and meaningfully reporting all combinations of Local Authorities would be extremely challenging - and we lack even the most basic supporting information at this spatial scale (e.g. annual numbers of overnighting visitors by UA). We do however note that our assumption of an all-Authority take-up of the Levy by implication means that here **we must present a ‘worst-case’ scenario** – i.e., assuming all dissuaded visitors take holidays elsewhere than Wales. In reality there is likely to be some substitution between destinations in Wales.

With these assumptions in mind, the process of analysis is as follows:

A. 100% of VL Passed on:

1. Average gross expenditure per trip (ET) on all items for 2019 those staying in Wales in commercial accommodation is estimated, alongside person nights²².
2. Average VL costs per trip (VLC) is assessed based on the suggested rates of £1.25 and £0.75 plus VAT, multiplied by average person-nights per trip.
3. The division of VLC by ET provides an estimate of the additional percentage cost of a visitor trip to Wales due to the Levy. This increase in cost then is applied to average trip cost to assess the likely level of reduced demand with reference to the Alma Economics range of reported elasticities.
4. We report on the outcome of weak, neutral and strong visitor responses, where the demand elasticity is represented by (respectively) the median of the lowest third of elasticities, the median of all elasticities, and the median of the highest third of elasticities²³, as reported by Alma Economics.²⁴ These thus translate into *optimistic*, *neutral*, and *pessimistic* assumptions regarding visitor responses to the new Levy.
5. The three scenarios result in lower visitor trips and revenues to Wales (to varying degrees by visitor type). Overnight tourism to Wales is then scaled downwards resulting in lower visitor demand, and tourism activity that is smaller in financial and employment terms (direct effects). Tourism businesses (and workers) consequently demand fewer goods and services from other Welsh sectors leading to further negative multiplier impacts (*indirect effects*).

²² The latest GBT covers 2021 and thus still impacted by COVID.

²³ As PED is (almost always) negative a number close to zero represents a weak relationship between price and demand; hence a PED of -10 (elastic) implies a 1% increase in price will see a 10% reduction in demand, but a PED of -0.1 (inelastic) implies a 1% increase in price will lead to a 0.1% reduction in demand. The ‘Highest’ elasticities are thus those that are most negative – i.e. lead to the largest visitor response.

²⁴ The Alma Economics report found a range of elasticities reflecting the characteristics of the destinations, different times considered, the different data and methodologies used in the studies. Here we adopt a cautious approach by using the median of the highest third of estimates reported.

6. We report the (annual) estimated economic changes to the economy in Wales in terms of GVA, disposable income, full-time equivalent employment, and 'other' (non-visitor levy) taxes on production²⁵.
7. We report on the change in global GHGs that result from trips to Wales.
8. We provide an estimate of the impacts across the Welsh economy (in aggregate) as the Levy revenue is re-spent by local authorities across Wales (in similar variables as above).

Note we make some key decisions in favour of readability in this report. One of these is that whilst we report three scenarios for visitor response (i.e. assumptions on elasticity) we consider only one 'pair' of visitor levy rates. To include higher or lower rates would necessarily 'multiply' by our elasticity scenarios and become very complex to read and understand. Note however, that the companion XLSX tool, held by Welsh Treasury can produce results for different elasticity and levy assumptions 'on demand'²⁶.

B. 100% of VL absorbed by businesses:

1. Total VLC assessed on the basis of 2019 visitor nights.
2. This revenue is deducted from (1) compensation of employees and (2) other value added based on the existing proportions of these value-added elements in the production functions of two relevant accommodation sectors (direct effects),
3. Losses that occur to compensation of employees result in further multiplier effects as tourism workers spend less and other sectors reduce in scale (indirect effects). Losses to other value added incur no further effects.
4. We provide an estimate of the positive impacts across the Welsh economy as the tax revenue is re-spent by local authorities across Wales (in similar variables as above).

Note, as in the previous case it is possible to make our analysis more complete – e.g. here including a '50% passthrough' (or any other percentage). We do not undertake this analysis, for reasons of brevity, modelling complexity, and a lack of any information on a reasonable percentage of pass through/absorption to choose. Readers can surmise partial-passthrough impacts would lie between the 100% and 0% absorption cases presented.

2.6 Modelling Constraints and Wider Context

There are several methodological and conceptual issues to consider in our approach. Firstly, this is very much an average and linear analysis: we assess the 'average trip' to Wales, and reduce consumption in a linear fashion in both cases – for example, we do not change the nature of tourism trips in terms of duration, type of accommodation used etc. Responses would, in reality, be far more mixed. Related to the above (and a limitation of IO modelling) is that all business responses are linear – an $X\%$ reduction in income leads to an $X\%$ reduction in sector scale, employment, profits and intermediate purchases. In reality (again) there would be a variety of

²⁵ VAT (a tax on products, not production) is wholly leaked from the regional economy.

²⁶ Please contact author for further details.

responses with some businesses finding more efficiencies for example, and others changing the nature of their offer²⁷.

Secondly, the scope of our analysis is Wales only. For example, other regions will benefit if visitors are lost to Wales and instead visit substitute destinations, but we cannot model these behaviours. Additionally, greenhouse gas savings that we report in Section 5 will be clawed back if visitors instead substitute other destinations (and indeed even more so if these are further away).

Thirdly, we are ignoring here some issues around the application of a levy, in the mid-2020s on a sector that is constrained to supply and demand in 2019. There are solid (data and compilation) reasons why a later base-year estimation is not possible. Instead, we have chosen our levy rate in consultation with Welsh Government colleagues to represent the latest current thinking (accepting this might change), and then deflated that rate from July 2023 to represent a June 2019 currency²⁸. We cannot know what will happen to inflation in the period after the time of writing and before the Levy is implemented, but our attribution of a 2019-based flat levy to a 2019 sector (as a percentage shock) means that our results represent the best possible estimate of the current impacts of a Visitor Levy for Wales. Note however all our reporting here is reflat to £2023m.

Another issue relates to the applicability to Wales of the Alma Economics review of price elasticity of demand for tourism. Most studies – whether empirically undertaken from an inbound or outbound perspective – appear to²⁹ concentrate on the behaviour and responses of tourists undertaking international trips. Such visitors are very much the minority of visitors to (and in) Wales, comprising less than 10% of Wales' overnight visitor trips in our 2019 base-year. Further, and relatedly, most studies refer (explicitly or by implication) to *national* destinations, rather than regions. There is insufficient evidence published on whether PED is (typically) higher or lower for national destinations catering to (largely) overseas visitors when compared to regional destinations catering to (largely) national-domestic visitors³⁰: is a German visitor more or less likely to substitute Greece for Spain, than a West-Midlander is to substitute Cornwall for Wales?

We note here that for our reference year of 2019, almost 60%, of overnight visitors in Wales are resident in Wales itself (19.2%), the North West of England (21.2%) or the West Midlands (18.7%). For these visitors, alternative (and alike) destinations to Wales that do not themselves imply travel costs (and travel times) greater than the marginal impact of the Levy are restricted to the north coast of Dorset and Devon (for the Midlands and south Wales), and the North West and Cumbrian coast (and with, of course, Scotland also about to have a similar tax). Economic rationality would suggest that *only if these destinations offer (at least) an experientially-equal offer to existing Welsh destinations would we see any significant losses to Welsh tourism*. If key Welsh

²⁷ We do not rehearse the varied limitations and caveats associated with modelling of IOTs here, but the interested reader is directed to Miller, R. E., & Blair, P. D. (2009). *Input-output analysis: foundations and extensions*. Cambridge University Press.

²⁸ Using ONS Consumer Price Indices for relevant industries; see <https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceinflation>

²⁹ The unit of analysis is not always clear, even when examining the original studies.

³⁰ There are a small number of subnational studies; apparently none that compare the same people across different trips; and of course estimates of PED vary widely even within studies.

destinations are sufficiently distinctive compared to (for example) Southport, Weston-Super-Mare, the Lakes, or Whitehaven, then actual visitor losses might be negligible. It is not however possible to model these 'quality relationships' – especially should Levy income be used to better manage and serve visitors, and improve Wales' tourism offer.

A final issue is that our IOT methodology cannot estimate changes in the accommodation supply-side, for example if providers exit, or are 'put off' entering the market by a tax. This is thus out of scope but may be worthy of further investigation.

Related to all the above, note that this report must be read and understood within the context of the wider set of regulatory impact assessments and other relevant material produced by Welsh Government.

All above discussions assume that part or all of any Visitor Levy is passed on to visitors in the form of increased prices (or an explicit surcharge, as happens in many extant cases). We examine the repercussions of this in Section 3 (with a 100% pass-on assumption), and in Section 4 address the case where the Levy is absorbed by businesses with no change in price charged to visitors.

3 Visitor Levy Economic Impact – 100% Levy Passed On

3.1 Quantifying the Demand Shock

Under the assumption that some (or the entirety) of a Visitor Levy is passed on to customers, users of commercial accommodation will experience an increase in the cost of their accommodation, and consequently of their trip as a whole. Assuming the aggregate tourism demand curve is downward sloping, this implies fewer people will visit Wales – or perhaps that the same number will visit, but for an on-average shorter duration. We assume here that businesses pass on 100% of the Levy. The quantification process is as outlined in Table 1 below – using our neutral outcome as the example.

Table 1 Percentage Change in Visitor Demand (Neutral)

£2019	UK-resident visitors (Band 1 Accom)	UK-resident visitors (Band 2 Accom)	Overseas visitors
Average per-trip expenditure	£230	£172	£258
Average per-trip bed-nights	3.21	3.24	7.09
Per trip Visitor Levy (ex VAT)	£4.02	£2.43	£8.86
a As a % of trip cost	1.7%	1.4%	3.4%
b Elasticity	-0.74		
Percentage change in consumer demand (a x b)	-1.3%	-1.0%	-2.5%

Note: all arrivals using commercial accommodation are assumed to be Band 1.

There are several issues to note in this process. Firstly, we predicate the impact of the levy as a percentage of total trip costs (as reported in GBTS 2019 for UK visitors, and as implied in Travel Trends 2019 for overseas visitors), not as a percentage of accommodation costs. This is because the visitor trip to (or in) Wales is a ‘composite’ product – the accommodation alone cannot provide the benefits of the trip independently from other recreational (or business), travel, food and other commodities consumed as part of the visit³¹.

Note that expenditures reported for overseas visitors are low compared to dwell time in Wales. This is because the only data source, ONS’ Travel Trends are for ‘within destination’ (i.e., UK), and do not include non-UK costs, including air travel. The unavoidable impact is that we will significantly over-estimate the reduction in international visits to Wales post-Levy. This will have a modest (and pessimistic) impact on our reporting of overall economic impacts.

The percentage changes in demand estimated in the process described in Table 1 are then applied to the baseline expenditure in 2019 by UK visitors using Band 1 and Band 2 accommodation, and by overseas visitors. This provides an estimate of the losses in visitor demand as fewer trips are taken to/in Wales after prices rise. As Table 2 shows, we would estimate this

³¹ Note the Alma economics evidence base also relates to changes in the prices of tourism goods and services more generally. Also note our elasticity analysis and consumption baseline (with respect to trip cost and consequent levy percentage) only relates to UK visitors using accommodation within the scope of the Levy not those in excluded accommodation – for example, staying in their own second homes or with friends. Again, data from the GBTS are used to assess this percentage. The relevant information is not provided in Travel Trends/International Passenger Survey for inbound visitors to UK regions, so the UK percentage is here applied to Wales.

reduction in consumption demand at £35.2m (2019 prices) for our pessimistic scenario. This is not, however the end of the story. Each bed-night in Wales now results in additional levy revenue – estimated at £30m (2019 prices) under the foregoing elasticity assumption (Table 1). Note then, because VAT accrues to the UK Government, the addition to public sector revenue does not fully offset the losses in trip expenditures (which would otherwise be the case for this central projection).

Table 2 Quantifying the Change in Visitor Demand (Neutral)

£2019	UK-resident visitors (Band 1 Accom)	UK-resident visitors (Band 2 Accom)	Overseas visitors	Total
Baseline Expenditure by Relevant Visitors	£1,624m	£107m	£515m	£2,246m
Percentage change in demand	-1.3%	-1.0%	-2.5%	-1.6%
Post-Visitor Levy Trip Expenditure	£1,603m	£106m	£502m	£2,211m
Trip Expenditure Losses (direct) £2019	-£21.0m	-£1.1m	-£13.1m	-£35.2m
Trip Expenditure Losses (direct) £2023 (reflated)	-£25.5m	-£1.4m	-£15.9m	-£42.7m
Post-levy bed-nights (million)	22.38	1.99	7.07	31.44
Visitor Levy Revenue £2019 (ex VAT)	£22.1m	£1.2m	£7.0m	£30.3m
Visitor Levy Revenue £2023 (reflated) (ex VAT)	£26.9m	£1.43m	£8.5m	£36.8m

Our estimates of gross expenditure losses and public revenue gains resultant on the Levy are illuminating, but do not represent regional economic impact. This is for several reasons.

- Visitor expenditure losses include VAT and other duties on tourists' spending which accrued to the UK government and did thus not impact the regional economy pre-Levy.
- Some trip expenditures would not occur in Wales (e.g., on travel) and hence are not lost to Wales if the trip does not take place.
- There are additional 'multiplier' impacts along supply chains and due to wage effects; these are wholly missing from Table 2.

To be clear: **these consumption and revenue impacts must be translated into regional economic impacts, which are causally correlated but different in concept, geography, and impact.** We rely for this upon the Input Output Tables and Tourism Satellite Account for Wales. These impacts are reported in the following Section (and in Table 4).

3.2 Impacts on the Visitor Economy

The baseline expenditure for each visitor type reported in Table 2 is amended to remove VAT and non-regional spending. The resultant figure is then multiplied by the Levy-related percentage change in consumer demand (for Band 1, Band 2, and overseas visitors separately) to estimate

the relevant reduction in regional economic demand for UK (in aggregate³²) and overseas visitors. We then assess the impact on the Welsh visitor economy using optimistic, neutral and pessimistic scenarios (Table 3).

Table 3 The Three Scenarios

Scenario	Elasticity	Source
Optimistic	-0.38	Median of the lowest third of Alma elasticities
Neutral	-0.74	Median of all relevant Alma elasticities
Pessimistic	-1.12	Median of the highest third of Alma elasticities

The resultant expenditure reductions are then hypothetically extracted from economic demand in Wales arising from UK (including Wales-resident) and overseas visitors, leaving it lower in both cases. This leads to direct and indirect reductions in output, income, value added and (non-Levy) levy take across the Welsh economy.

Economy-wide visitor Levy-related Trip expenditure related losses in Welsh economic output (in 2023 terms) range from an estimated -£16.1m in the most optimistic scenario, to -£47.5m (Table 4). This reduction in demand arises mostly from businesses directly serving visitors, i.e., largely in hospitality and transport but also includes along their supply chains and via induced income effects – i.e., as those businesses in turn require fewer regional labour units, raw materials, and intermediate inputs.

The reduction in economic activity has implications for other economic aggregates. The total (direct and indirect) loss to Gross Value Added is estimated in the range of -£9.1m to -£26.8m whilst total disposable income would fall by between -£4.3 and -£12.6m.

Table 4 Annual Whole-Economy Visitor Expenditure-related Losses of a Visitor Levy

<i>All Direct + Indirect, £2023m</i>	<i>Optimistic</i>	<i>Neutral</i>	<i>Pessimistic</i>
Output	-£16.1	-£31.4	-£47.5
Disposable Income	-£4.3	-£8.3	-£12.6
Gross Operating Surplus	-£3.1	-£6.0	-£9.1
Income & Self Employment Tax, Pensions	-£1.4	-£2.7	-£4.1
Taxes Less Subsidies on Production	-£0.4	-£0.7	-£1.1
Gross Value Added	-£9.1	-£17.7	-£26.8
<i>Approximate percent of Welsh Economy GVA</i>	<i>-0.011%</i>	<i>-0.022%</i>	<i>-0.033%</i>
Full-Time Equivalent Employment	-250	-485	-730
<i>Approximate percent of Welsh Workforce</i>	<i>-0.018%</i>	<i>-0.035%</i>	<i>-0.053%</i>

Note: Will not sum due to separate rounding.

³² This is necessary as the IO Tables do not have separate demand vectors for Band 1 and Band 2 accommodation visitors, although we can estimate gross expenditure for each.

Gross employment losses consequent on the Levy would range from -250 FTEs to -730 FTEs across the economy in our scenarios.

Although these impacts are felt across the entire economy, the concentration of visitor spending in a small number of labour-intensive industries means that impacts on employment are somewhat greater than on financial economic aggregates. For the Neutral scenario, we estimate around 485 full time equivalent workforce jobs³³ would be lost following the introduction of the visitor levy. This equates to approximately 0.035% of the 2019 Welsh regional workforce, whilst gross value added losses are only an estimated 0.022% of the regional total.

As Table 5 shows, in the Neutral³⁴ case around 345 FTEs (or approximately 70%) of these losses would be occur within accommodation and food services, and another 50 FTEs (10%) in the retail and wholesale sector.

Table 5 The Employment Impacts of a Visitor Levy

<i>Full time equivalent workforce</i>	UK Visitors	Overseas Visitors	Total
Primary Industries	*	*	*
Manufacturing	*	*	-10
Utilities & Construction	*	*	-10
Wholesale & Retail	-45	*	-50
Transport services	*	*	-10
Accommodation & Food Services	-275	-70	-345
Other Private Services	-20	*	-30
Public Sector & other	-25	*	-30
All Sectors	-395	-90	-485

Note: * - suppressed as losses fewer than 10FTEs. Rounded to nearest 5. Will not sum due to independent rounding.

3.3 Visitor Levy-Consequent Public Sector Expenditure Revenue Effects

As noted in Section 2.3, any Visitor Levy would, if it resulted in higher prices for accommodation, result in reduced business income and economic activity, but also consequent new economic activity as local authorities re-spend the new Levy revenue – whether directly in support of tourism, or on a wider set of activities.

We are able, within the Input-Output Tables, to assess the direct and multiplier benefits of this expenditure in a conceptually similar way to the assessment of potential losses described in Section 3.2 Such an assessment can only be indicative, as we do not know what activities or infrastructures might be supported by Levy-consequent public spending – and indeed, whether this would occur in-year or in the financial years following the accrual of Levy income.

This section however provides an illustrative example of how new public spending would serve to offset – in part – the losses to the tourism economy following reductions in visitor spending. A Levy would effectively comprise a direct, short-term transfer of revenue from the private to the public sector, albeit with the expectation that Levy revenue would benefit Welsh businesses in the longer

³³ Including self-employed.

³⁴ Industry totals can be scales linearly by FTE totals to estimate losses in the Optimistic and Pessimistic scenarios.

term as the income was used to support a more resilient, sustainable, and higher value set of visitor activities³⁵.

We cannot know the details of Levy-consequent public expenditure. Thus, to enable our illustrative analysis, we make the following assumptions.

1. As Levy income is (assumed here) VAT-able, only the remainder is available for local authorities in Wales to spend, with the VAT element 'leaking' from Wales and thus not available to Local Authorities for expenditure purposes.
2. All remaining Levy income is spent in the same year as its accrual (following relevant transformations and discounting of non-regional elements).
3. Half of the revenue is spent on maintaining or expanding current services, and half on infrastructure or capital developments.
4. The 'current' expenditure pattern (in terms of commodities) follows that of public sector spending as reported in the 2019 IOTW.
5. Capital elements are modelled following the spending pattern for Gross Fixed Capital Formation (GFCF) as reported in the 2019 IOTW.

It is worth noting that capital expenditures (GFCF) result in a higher level of economic leakage from Wales (per £1m expenditure) with Wales having very few headquartered 'Tier 1'³⁶ suppliers in relevant sectors. It is, of course possible that individual Authorities may spend a lower percentage of Levy income on capital expenditure, particularly for smaller 'pots'. Higher spend on revenue rather than capital projects would (under our modelling approach) increase local economic impacts³⁷ but we consider a 50:50 split is reasonable in the absence of any survey or other data – and where some Levy funds will likely be substantial even at UA level.

After accounting for VAT and leakages from the Levy revenue as detailed in Table 2, consequent new public spending would result, in the Neutral scenario, in a £34.8m increase in Output in Wales (direct plus multiplier effects). As with Levy-consequent reductions in economic output, increases in public-sector spending related to Levy income would impact other economic value-added elements such as income and profits. These positive impacts are estimated in Table 6³⁸, summing to around £20m in GVA. Additional current and capital expenditure consequent on Visitor Levy re-spending would support around 345 FTE jobs across Wales. Employment would be created predominantly in the public sector, and in construction activities. Note the lack in variation in public expenditure-consequent economic impact reported across the three scenarios. This occurs because the Levy is charged on *all* visitor nights staying in Wales, and this baseline moves very modestly, even in the most pessimistic scenario.

³⁵ Not possible to model here.

³⁶ The key 'first-round' suppliers who bid directly for large contracts then subcontract further.

³⁷ For example, if we used a '100% revenue support' assumption in Table 6, employment impacts would increase by around 40% in each case.

³⁸ We ignore here the losses to public sector revenue as business rates & regional tax-take reduces following Levy-related reduction in economic activity. These losses will be very small (much less than £1m).

Table 6 The Estimated Whole Economy Annual Impact of Levy-Consequent Public Spending

<i>All Direct + Indirect, £2023</i>	<i>Optimistic</i>	<i>Neutral</i>	<i>Pessimistic</i>
Output	£35.2	£34.8	£34.6
Disposable Income	£9.4	£9.3	£9.3
Gross Operating Surplus	£5.9	£5.9	£5.9
Income & Self Employment Tax, Pensions	£4.3	£4.2	£4.2
Taxes Less Subsidies on Production	£0.2	£0.2	£0.2
Gross Value Added	£19.9	£19.7	£19.6
<i>Approximate percent of Welsh Economy GVA</i>	<i>0.024%</i>	<i>0.024%</i>	<i>0.024%</i>
Full-Time Equivalent Employment	350	345	340
<i>Approximate percent of Welsh Workforce</i>	<i>0.025%</i>	<i>0.025%</i>	<i>0.025%</i>

3.4 The Net Economic & Business Impact of the Visitor Levy

'Netting off' increases in regional economic activity from Levy-consequent public expenditure from losses in the visitor economy suggests modest overall losses – ranging from +£10.8m to -£7.3m of GVA per annum across the scenarios (in 2023 prices). Net employment losses range between effectively zero in the optimistic scenario, to around 390 FTE job losses in the most pessimistic. The latter comprises around 0.028% of Welsh annual FTE employment, with this number higher than for financial metrics (less than 0.01% losses) due to the labour intensity of tourism activities relative to the wider economy (Table 7).

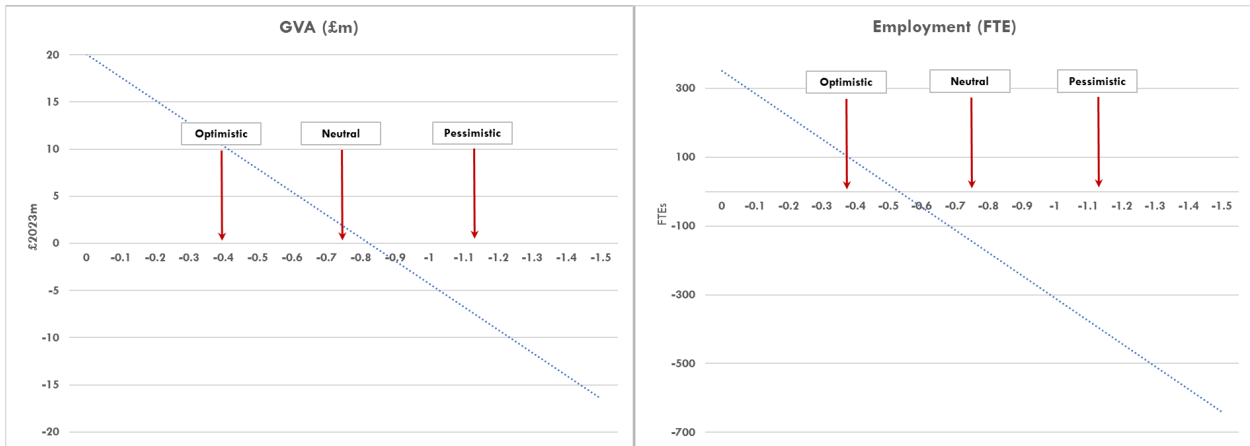
Table 7 The Estimated Whole Economy Net Annual Impact of Levy-Consequent Public Sector Expenditure

<i>All Direct + Indirect, £2023</i>	<i>Optimistic</i>	<i>Neutral</i>	<i>Pessimistic</i>
Output	£19.0m	£3.4m	-£12.9m
Disposable Income	£5.2m	£1.0m	-£3.3m
Gross Operating Surplus	£2.9m	-£0.1m	-£3.2m
Income & Self Employment Tax, Pensions	£2.9m	£1.5m	£0.1m
Taxes Less Subsidies on Production	-£0.2m	-£0.5m	-£0.9m
Gross Value Added	£10.8m	£1.9m	-£7.3m
<i>Approximate percent of Welsh Economy GVA</i>	<i>0.013%</i>	<i>0.002%</i>	<i>-0.009%</i>
Full-Time Equivalent Employment	100	-140	-390
<i>Approximate percent of Welsh Workforce</i>	<i>0.007%</i>	<i>-0.010%</i>	<i>-0.028%</i>

Note: Tables 5-7 will not add due to separate rounding

It should be noted that the modelling produces linear responses to changes in elasticity assumptions, and thus estimates of net changes can be derived for any suggested elasticity (Figure 1).

Figure 1 The Net Annual GVA and Employment Change Impacts of Different Elasticity Assumptions



4 Visitor Levy Economic Impact – Absorbed by Business

4.1 Quantifying the Direct Business Shock

Our assumption in this alternative scenario that accommodation businesses do not pass on any of the cost of the Visitor Levy means that there is no change to the aggregate level of visitation to Wales. Whilst accommodation revenues thus remain unchanged, business expenditures are increased in line with the number of bed-nights multiplied by the Levy rate (for relevant bands) – in aggregate, some £43.5m in 2023 prices³⁹ (deflated to £35.8m to 2019 prices for modelling purposes). With VAT added, this reaches a total of £52.2m in 2023 prices (and £43.0m in 2019 terms).

Thus, taking the 2019 visitor supply side as a baseline, we assume that the £43m (Levy-plus-VAT) is paid from business revenues. We further assume that tourism businesses are unable to reduce intermediate input costs in response the consequent ‘squeeze’ on business finances⁴⁰. Instead, required savings are found from within elements of value added, which are reduced linearly based on existing value added composition in each of our two hospitality sectors.

4.2 ‘Indirect’ Elements – and hence total losses

Most Input-Output analyses require the estimation of supply-chain responses to an economic shock. Our assumption here is that neither input prices change, nor do visitor volumes, nor economic scale. This means that there are no ‘Type 1’ supply chain multiplier effects. There are however some indirect effects consequent on the Levy squeeze, reducing income to be spent (in part) across the Welsh economy, and resulting in a modest further reduction to economic activity. Table 7 provides this calculation (after reflation to 2023 prices) estimating total value added losses to the Welsh economy at -£61.8m⁴¹.

Table 8 Annual Visitor Levy Economic Losses - 100% Absorption

	Direct Levy-Related Losses			Induced (wage) effects			Total (direct+induced) effects		
	Hotels	Other Accom	Total	Hotels	Other Accom	Total	Hotels	Other Accom	Total
All £2023m									
Disposable income (workforce)	-£23.5	-£5.4	-£28.9	-£7.9	-£1.7	-£9.6	-£31.4	-£7.1	-£38.5
Gross Operating Surplus (excluding mixed income)	-£8.8	-£3.7	-£12.5	-	-	-	-£8.8	-£3.7	-£12.5
Income & self emp. tax, pensions	-£6.8	-£1.1	-£7.9	-	-	-	-£6.8	-£1.1	-£7.9
Taxes less subsidies on production	-£1.5	-£1.4	-£2.9	-	-	-	-£1.5	-£1.4	-£2.9
Gross Value Added	-£40.6	-£11.6	-£52.2	-£7.9	-£1.7	-£9.6	-£48.5	-£13.3	-£61.8

Note: Will not add due to independent rounding

³⁹ This is higher than the Levy revenue reported in Table 2 as bednights do not decrease if prices remain static.

⁴⁰ This is probably de facto true in most cases, for example where tourism businesses are very small, but also required to make our analysis manageable.

⁴¹ Note this analysis implies employees reduce wages in line with the lost revenue and employment level remains unchanged.

4.3 Visitor Levy-Consequent Public Sector Expenditure & Net Revenue Effects

Welsh Local Authorities will gain extra spending power whether businesses absorb or pass on the Levy. Indeed, in the absorption case Levy revenue is modestly higher as the visitor economy does not shrink. Using the assumptions detailed in Sections 2.4 and 3.3 above, we estimate the additional GVA benefits at £20m. The net-effect of the ‘absorption’ case is therefore a loss of £40m in gross value added to Wales, which includes a loss of almost £30m in disposable income⁴².

Table 9 The Estimated Whole Economy Net Annual Impact of Levy-Consequent Public Spending (Absorption)

£2023	Levy-related losses	Public Expenditure benefits	Net Impact
Disposable Income	-£38.5	£9.5	-£29.0
Gross Operating Surplus	-£12.5	£6.0	-£6.5
Income & Self Employment Tax, Pensions	-£7.9	£4.3	-£3.5
Taxes Less Subsidies on Production	-£2.9	£0.2	-£2.7
Gross Value Added	-£61.8	£20.0	-£41.7
FTE Employment (see footnote)	n/a	350	350

Note: Will not add due to independent rounding

⁴² Note that the net additional employment of 350 FTE jobs is an artefact of our assumptions effectively reducing wages in accommodation sectors and avoiding job losses.

5 The Visitor Levy and Welsh Greenhouse Gas Emissions

5.1 Methodology & Background

The Input-Output Tables for Wales have long benefitted from an environmental module that allows an appreciation of the greenhouse gas (GHG) emissions implications of Wales' economic activity. This has been combined with the Tourism Satellite Account to provide novel and policy-relevant intelligence on the relationship between tourism to (and in) Wales, and the climate⁴³.

This enables here an appreciation of how changes in the scale of tourism to and in Wales, consequent on a Visitor Levy, would reduce GHG emissions to the atmosphere – and conversely, create counterbalancing emissions as local authorities spent the consequent revenue. This section presents the results of that analysis.

Our assumptions closely follow those detailed in Sections 2 and 3 above. Our methodology and coverage, however, differs somewhat. In detail:

1. We are able to include all GHG emissions arising consequent on tourism trips and in tourism supply chains globally, including in private and public transportation taken by visitors to get to/from/around Wales (albeit with lower accuracy for non-UK supply chain effects).
2. We only count **Welsh trip-related outcomes**: that is, ignoring 'counterfactual' emissions that arise if visitors go elsewhere, or stay at home. This is, of course unlikely in the real world and tourism emissions will be 'displaced' if visitors travel to other UK regions rather than Wales.
3. Percentage changes in visitation from UK-domestic and overseas visitors respectively resultant on the Levy in our **Neutral** scenario are applied to the baseline whole-trip GHG emissions to estimate reductions in emissions.
4. Emissions consequent on increased public sector expenditure are assessed by estimating the ratio of GHG emissions to public and capital expenditure respectively from the IO Tables⁴⁴.
5. Changes are reported in tonnes of CO₂ equivalents (CO₂e).
6. We only address the scenario where 100% of the Levy is passed on – modelling the GHG impacts of reduced wages in the 'absorption' scenario is overly challenging⁴⁵.

Full details on the methodology used to assess tourism emissions are available from Jones (2023)⁴⁶.

⁴³ See for example Jones, C. (2013). Scenarios for greenhouse gas emissions reduction from tourism: An extended tourism satellite account approach in a regional setting. *Journal of Sustainable Tourism*, 21(3), 458-472. <https://orca.cardiff.ac.uk/id/eprint/43540/>

⁴⁴ In £2019 and including all direct/indirect, Wales/rest of world emissions.

⁴⁵ More on why is available from the author.

⁴⁶ Jones, C. (2023). The carbon footprint and decarbonisation (or not) of tourism: insights from environmentally-extended regional input output analysis. <https://orca.cardiff.ac.uk/id/eprint/156224/>

5.2 Results

As Table 10 shows, given the assumptions detailed above and elsewhere, the imposition of a visitor levy, if 100% passed on by business, results in a reduction in Wales' tourism GHG footprint of 41,000 tonnes of CO₂e per annum – some 1.6%. This reduction is equivalent to around 0.12% of Wales' 2019 estimated consumption carbon footprint⁴⁷.

Table 10 also shows that as the public sector re-spends Levy income on current and capital activities, economic activity, jobs, incomes and hence GHG emissions rise, here by an estimated 7,000 tonnes per annum. The net effect is thus a net change of around -32,000 tonnes in Wales' GHG emissions footprint. This reduction in Wales' global carbon footprint is equivalent to around 0.1% of Wales' annual consumption-based GHG footprint.

Table 10 Visitor Levy-Consequent Changes in Wales' GHG Footprint (tCO₂e) - 100% Passed On

Total Relevant Baseline GHG Tourism 2019	
	Total
Wales	654,000
Outside Wales	1,424,000
Total	2,079,000
Post-Visitor Levy Visitor Emissions to & In Wales	
Wales	645,000
Outside Wales	1,392,000
Total	2,038,000
Levy-related Reduction in Wales Tourism GHG Emissions	
Wales	-9,000
Outside Wales	-32,000
Total	-41,000
Visitor Levy Public Expenditure Consequent Increase in GHG Footprint	
<i>Increase in Wales Tourism GHG Emissions</i>	
Wales	7,000
Outside Wales	2,000
Total	9,000
Net Change in Wales Tourism GHG Emissions	
Wales	-2,000
Outside Wales	-30,000
Total	-32,000

Note that percentage savings in GHG are far larger than percentage economic losses. This is due to avoidance of significant CO₂ from travel (especially international air travel): i.e. tourism in Wales is (currently) a relatively climate-damaging economic activity. The UK central estimate of the social cost of carbon for 2023 (£250 per tonne⁴⁸) would value these savings at £8m.

⁴⁷ <https://www.gov.wales/sites/default/files/publications/2022-12/final-statement-of-progress-cb1.pdf>

⁴⁸ <https://www.gov.uk/government/publications/valuing-greenhouse-gas-emissions-in-policy-appraisal/valuation-of-greenhouse-gas-emissions-for-policy-appraisal-and-evaluation>

6 Summary

6.1 Background

We use a long-established, extensively peer reviewed, and Wales-bespoke Cardiff Business School economic account to model the economic and climate impact of the proposed Visitor Levy. Welsh Government data was used to further modify this “*Input-Output Table*” to further refine the representation of Wales’ accommodation sector.

Results from the Alma Economics’ *Evidence review of elasticities relevant to a visitor levy in Wales* were used to estimate the likely response of visitors to higher post-Levy costs of any overnight trip to Wales (the *price elasticity of demand*). We present three scenarios across the range of Alma results, from a relatively weak relationship between price and visitor behaviour through to (pessimistically) assuming a strong relationship.

Limitations in data and modelling means we assume the Levy is employed by all relevant authorities and thus there is no within-Wales visitor destination switching – both very unlikely in practice, and thus with this very much a worst-case scenario. Levy rates were set at £1.25 and £0.75 for Band 1 and 2 respectively. VAT is then added.

6.2 Economic Impact

Our modelling suggests that, under our *neutral* elasticity assumption, visitor demand shrinks by around 1.6% if accommodation businesses pass on 100% of Levy costs. This results in estimated direct and ‘multiplier’ yearly losses of £17.7m in gross value added and 485 FTE jobs across the Welsh economy (most in the visitor economy).

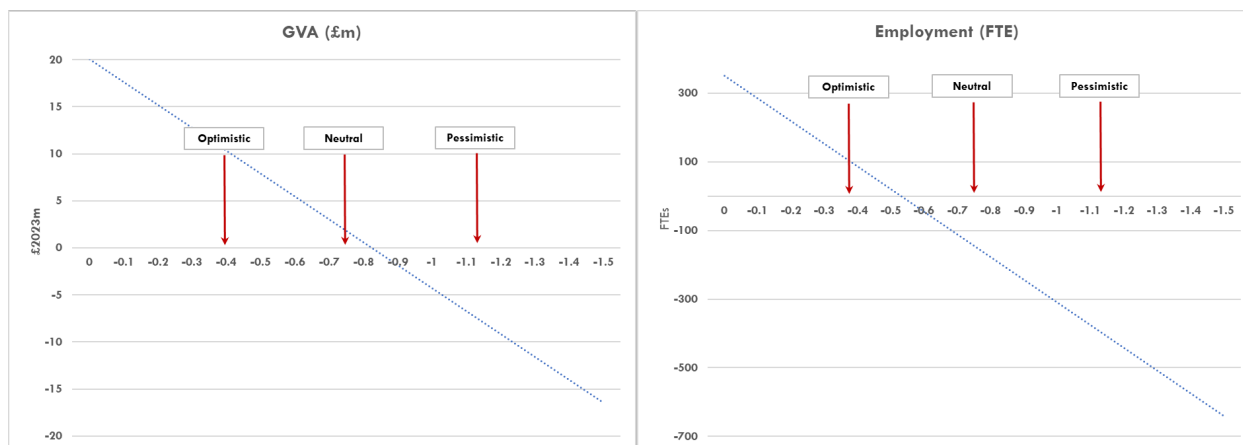
These impacts are in part counterbalanced as local authorities re-spend Levy income (in part) on Welsh goods and services. We estimate that near £20m of new value added, and 345 FTE jobs are created annually because of this new spending. In *net* terms then, a Visitor Levy at the level and type assumed would see a reduction of £1.9m in Wales’ annual gross value added (effectively zero in a £70bn+ economy), and a loss of 140 FTE jobs. Note that the Welsh economy creates and destroys around 100,000 jobs each year, with net changes typically in the tens-of-thousands⁴⁹.

If Levy costs are borne wholly by the accommodation sector, with the Levy absorbed in existing price structures, net economic losses are larger at around £40m of GVA per annum.

Net economic changes overall might then range between +£10.8m and -£42m of GVA – but this assumes visitors will desist from coming to Wales following the imposition of the tax, and instead choose from a relatively limited set of near destinations.

⁴⁹ <https://www.gov.wales/gross-employment-flows-or-employment-churn-wales-2011-2014>; www.nomisweb.co.uk

Our estimates of net economic impact are fundamentally reliant on our assumptions regarding visitor behavioural responses to price changes. Figure 1 below demonstrates this by displaying the estimated net annual effect on the Welsh economy of different PED assumptions. For example, an illustrative unit-elastic assumption of visitor response (i.e., a PED of -1) would imply a net decrease of around -£4.3m in GVA, and just over 310 FTE job losses.



6.3 Climate-Relevant Greenhouse Gas (GHG) Impacts

Using a parallel methodology to our economic analysis we can estimate the changes in Wales-tourism related GHG emissions – occurring both inside and outside Wales – and also the GHG emissions consequent on new public sector expenditure.

We estimate the reduction in Wales' tourism GHG global footprint at 41,000 tonnes CO₂e per annum, with public spending adding 9,000 tonnes of CO₂e and hence a net reduction of 32,000 tonnes of CO₂e. Using UK Government estimates of the social cost of carbon would value these savings at over £8m.