



Visit *Scotland* | *Alba*™

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CodeClan Professional Data Analysis
Final Project

The Brief

Aim:

- To improve understanding of Scotland's tourism data and assist in optimising the country's tourism assets.

Who Are Visit Scotland?

- Scotland's national tourist board, which works with private businesses, public agencies and local authorities to maximise Scotland's tourism assets.

Questions:

- How have tourism rates changed over time?
- When looking at regional tourism, what insights can we gain?
- Where are our visitors from? Do they differ in the money they spend or the number of visits?
- Can we predict spending and visits?

Key Performance Indicators:

- Number of Visits
- Expenditure
- Expenditure per Visit



The Data

Data Sources:

- **The Great Britain Tourism Survey**
 - Regional Domestic Tourism (via Visit Scotland)
 - Domestic Overnight Visitors to Scotland (via Scottish Tourism Observatory)
- **International Passenger Survey**
 - International Visitors to Scotland (via Scottish Tourism Observatory)
- **Tourism Businesses In Scotland** (via Scottish Tourism Observatory)

Data Considerations:

- Due to the significant impact of COVID-19 on tourism and data collection, the data used for this presentation will only cover up to and including the year 2019.
- Before being made publicly available, the data is aggregated to different degrees. Survey responses from individuals are not disclosed.
- In light of the limited time frame for analysis and presentation, the analysis will focus only on overnight visits.

Ethics:

- There were no ethical concerns regarding privacy, business applications or data sourcing.



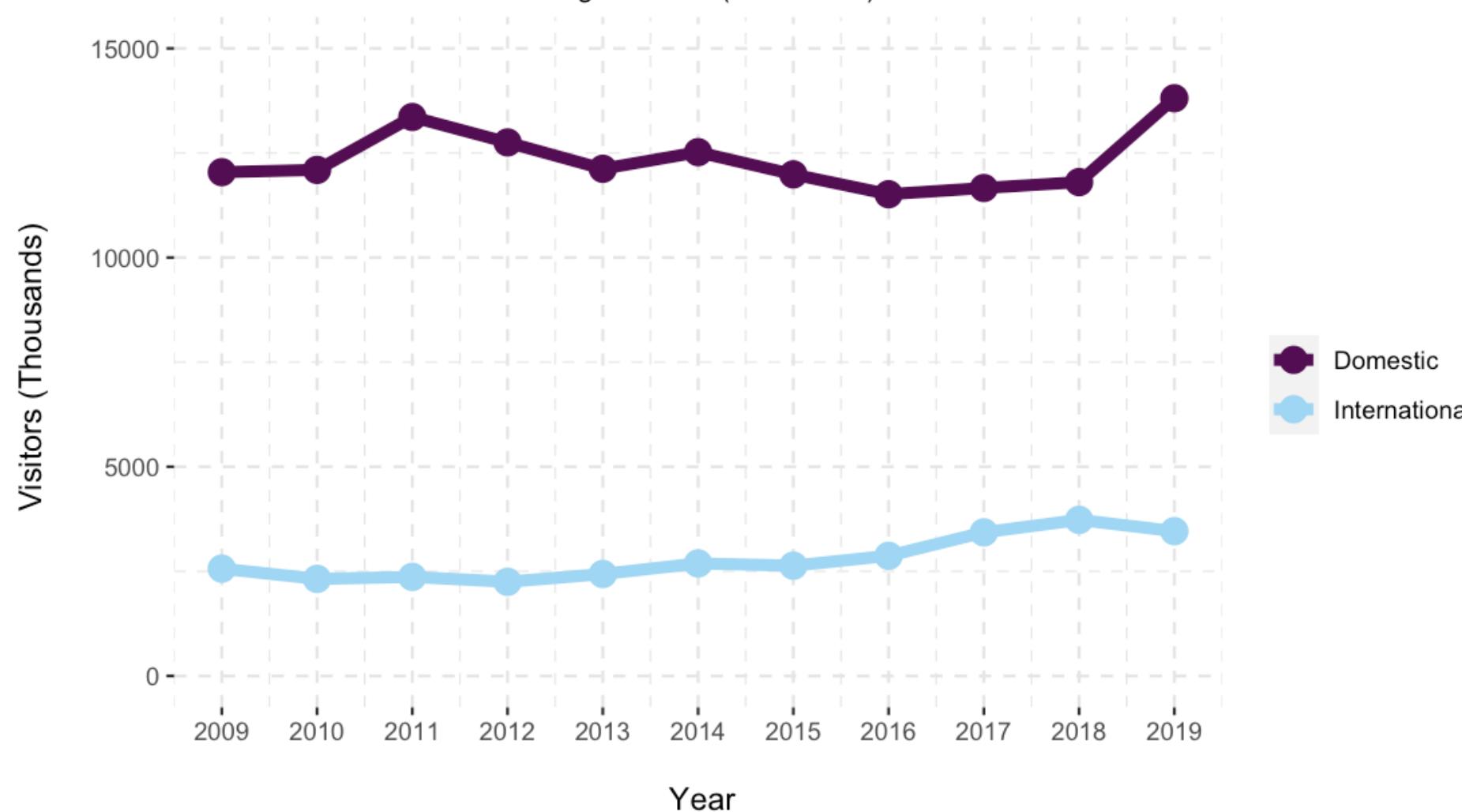


TRENDS OVER TIME

Domestic & International Overnight Visitors

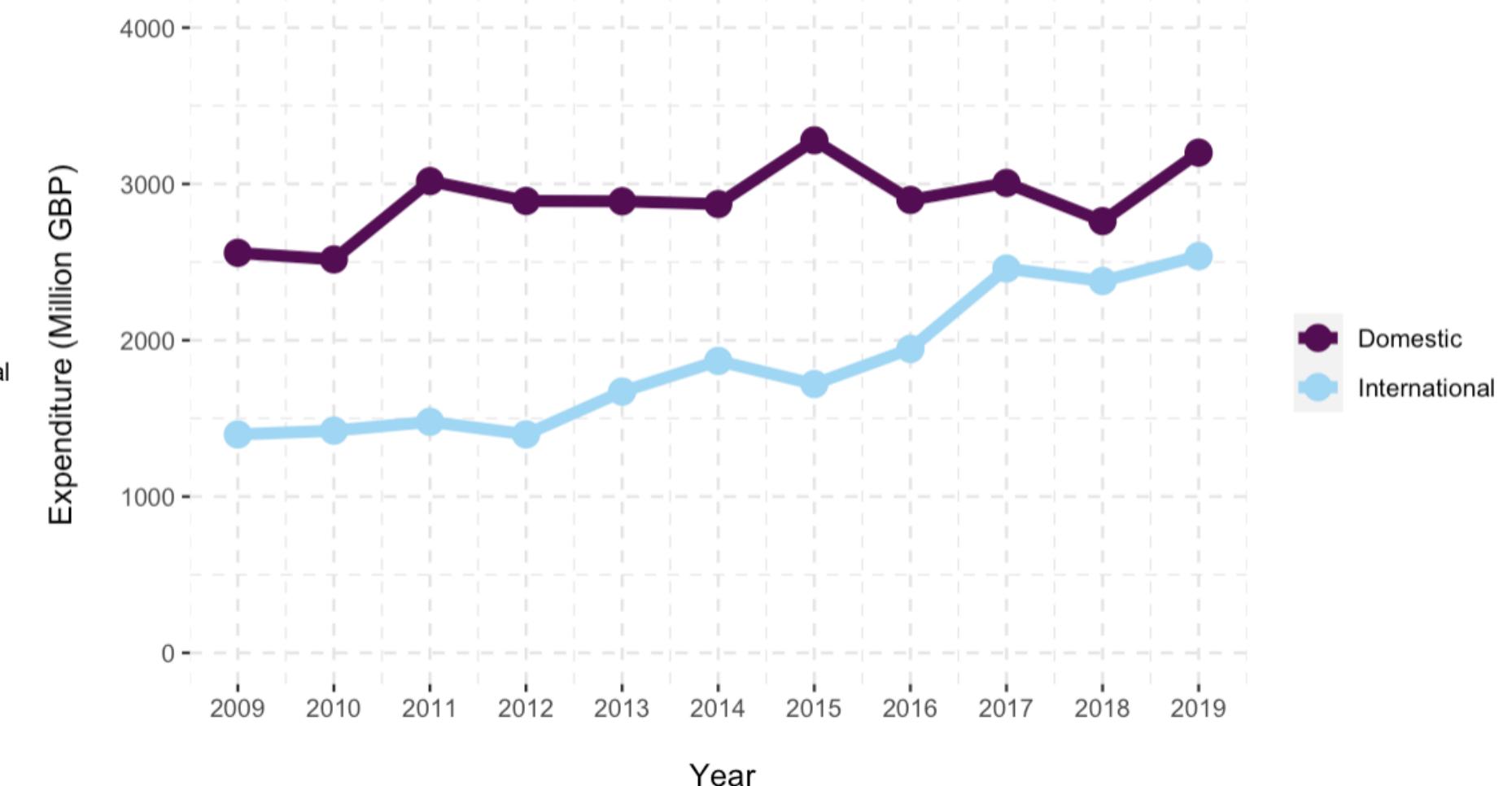
Annual Visits

Domestic & International Overnight Visitors (2009-2019)



Annual Expenditure

Domestic & International Overnight Visitors (2009-2019)



Domestic:

Mean: 12,333,136

Median: 12,095,000

IQR: 739,850

SD: 717,450

International:

Mean: 2,795,579

Median: 2,634,604

IQR: 749,987

SD: 515,150

Domestic:

Mean: ~2899 Million (GBP)

Median: 2891 Million (GBP)

IQR: ~195 Million (GBP)

SD: ~233 Million (GBP)

International:

Mean: ~1843 Million (GBP)

Median: ~1720 Million (GBP)

IQR: ~712 Million (GBP)

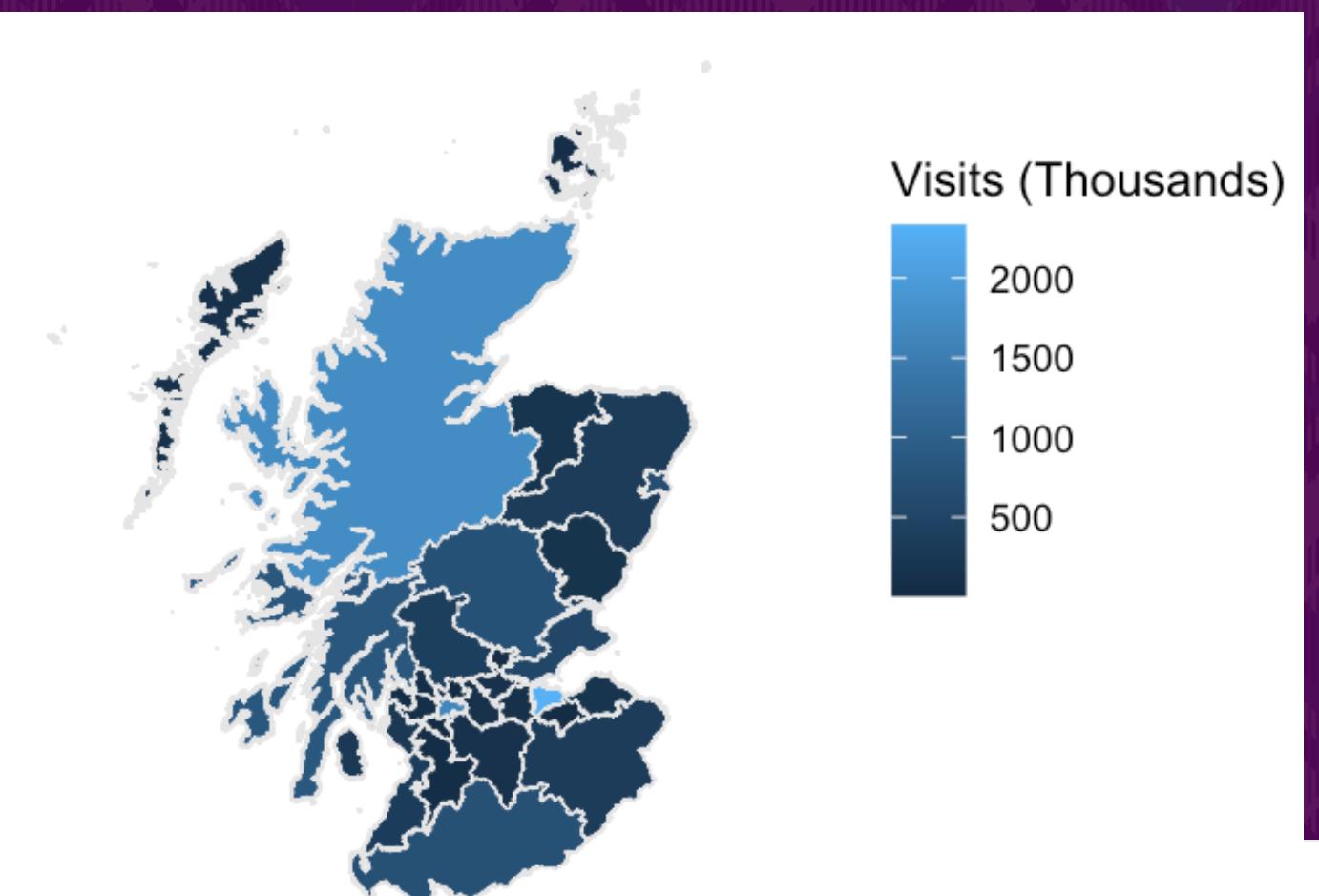
SD: ~437 Million (GBP)



DOMESTIC TOURISM

Domestic Tourism by Region

Average Annual Visits & Expenditure (2009 / 2019)

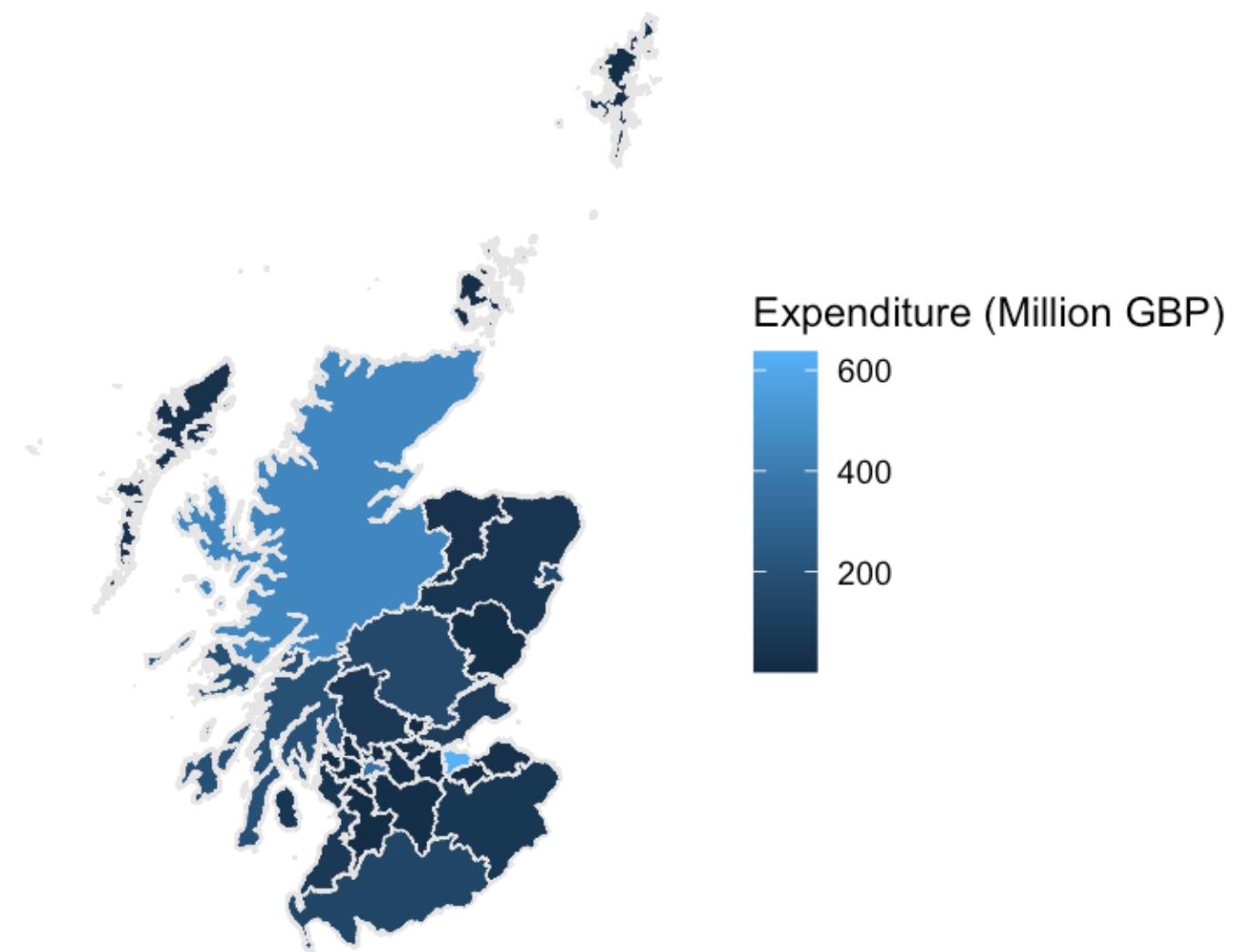


Visits

Only **Edinburgh**, **Glasgow** and **Highlands** achieve an average of more than **1 Million visitors** per year.

Expenditure

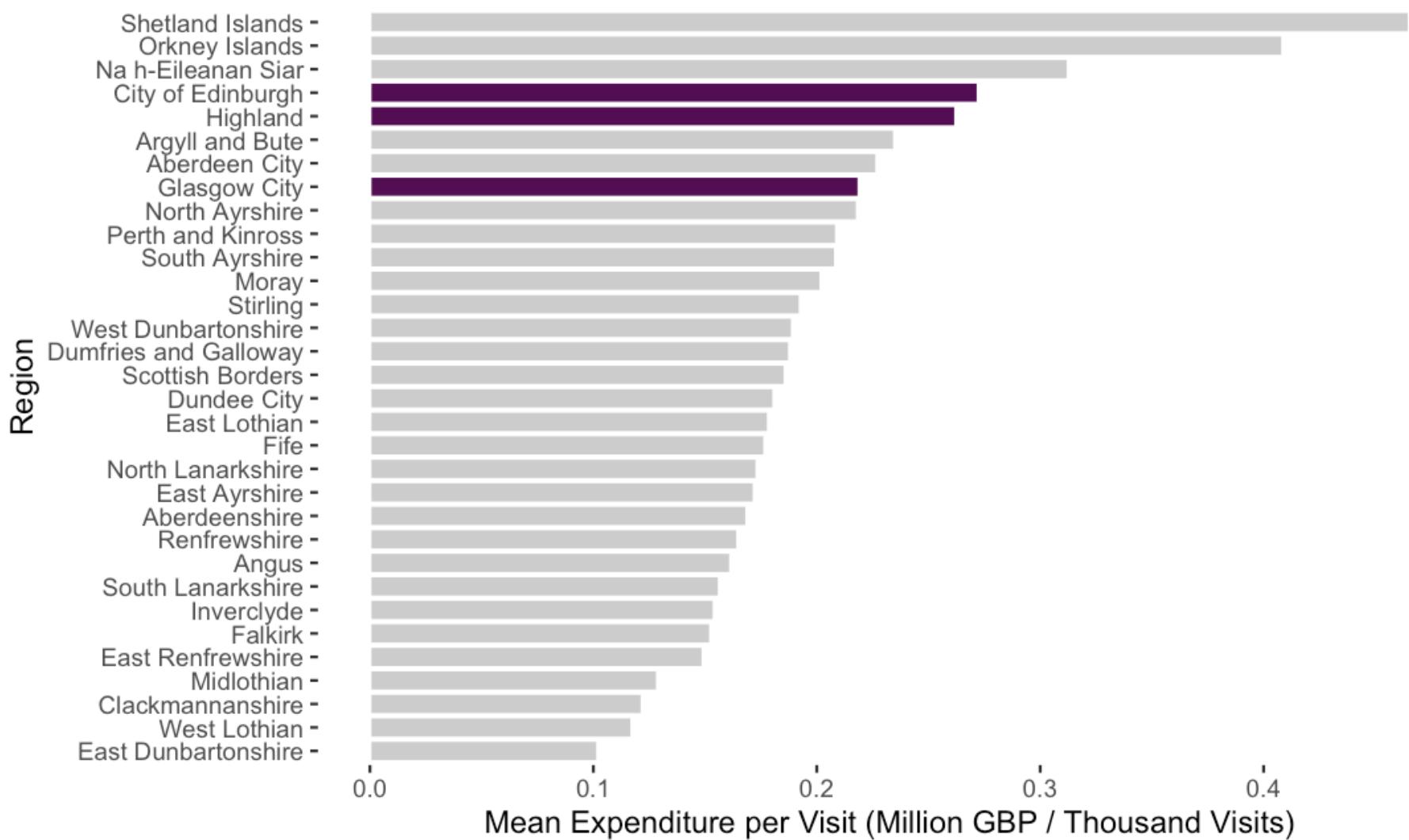
Only **Edinburgh**, **Glasgow** and **Highlands** achieve an average of more than **300 Million (GBP)** in expenditure per year.



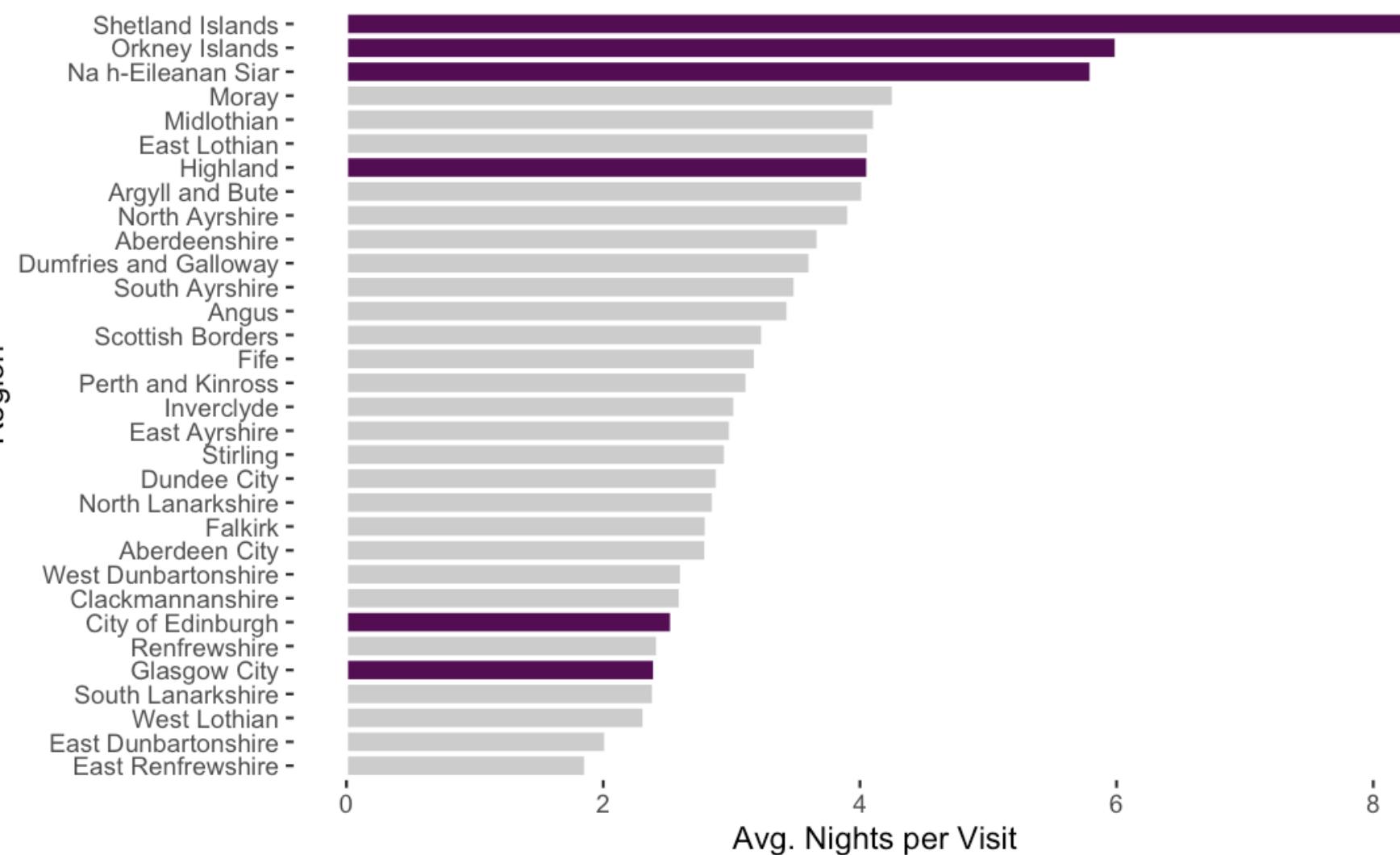
Domestic Tourism by Region

Average Expenditure & Nights Stayed Per Visit (2009 / 2019)

Domestic Tourism Mean Expenditure per Visit



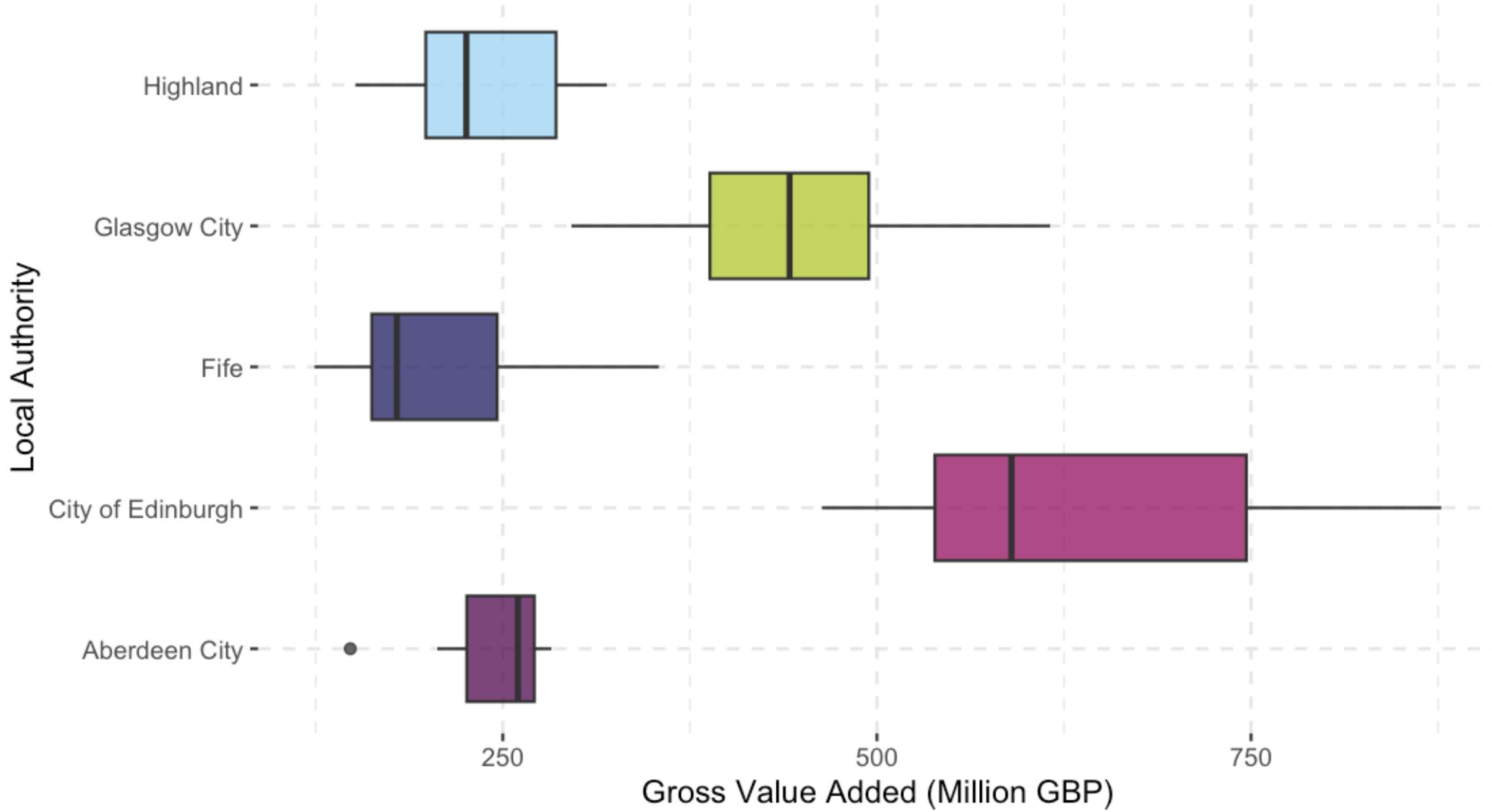
Domestic Tourism Avg. Nights per Visit



Gross Value Added

Distribution of Annual Gross Value Added

Top 5 Regions: 2009-2019



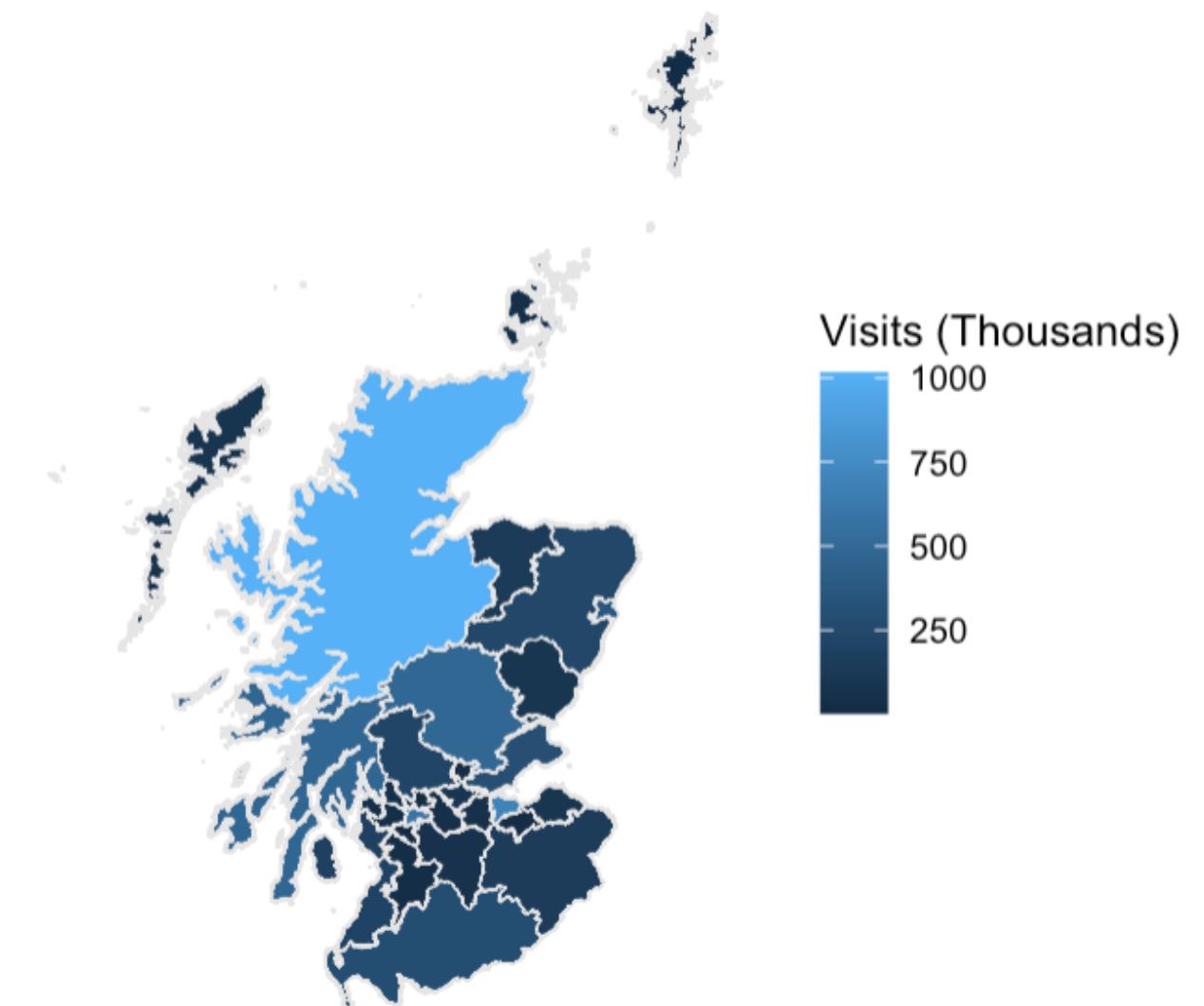
"Gross value added, is defined as the value of output less the value of intermediate consumption and is a measure of the contribution to GDP made by an individual producer, industry or sector."

World Tourism Organisation

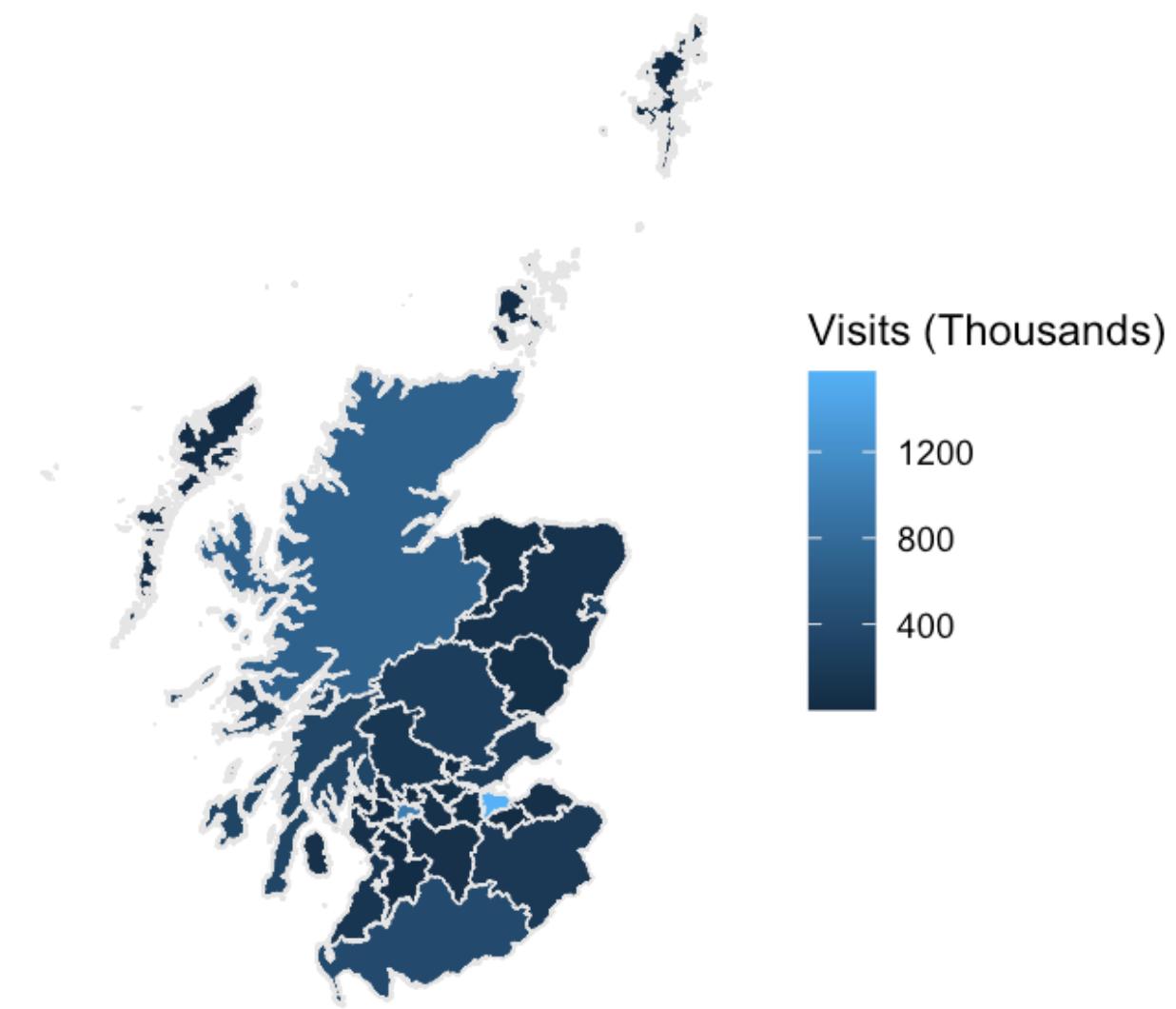
Average Annual Visits by Region (2009 / 2019)

A Comparison of Scottish and English Based Visitors

Average Annual Number of Scottish Based Vistors
By Region

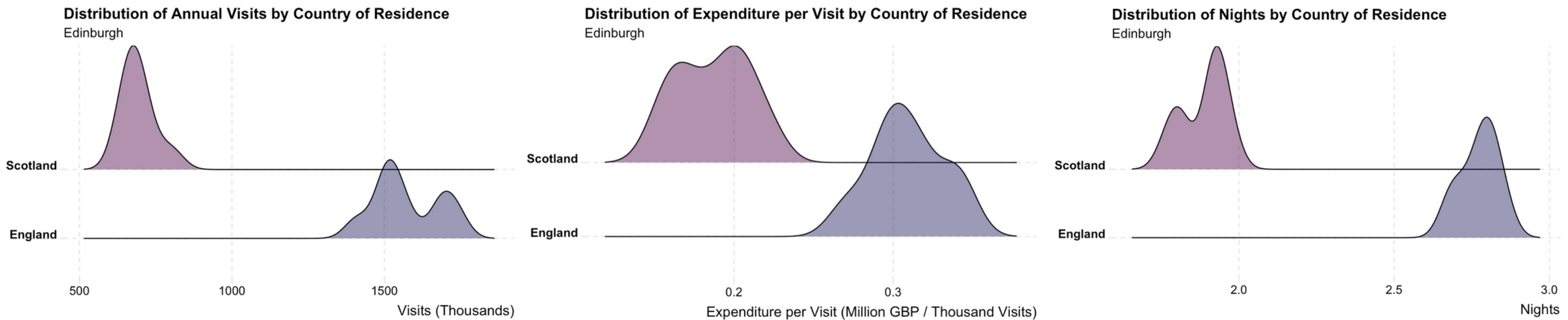


Average Annual Number of English Based Vistors
By Region



Marketing Edinburgh To Domestic Tourists

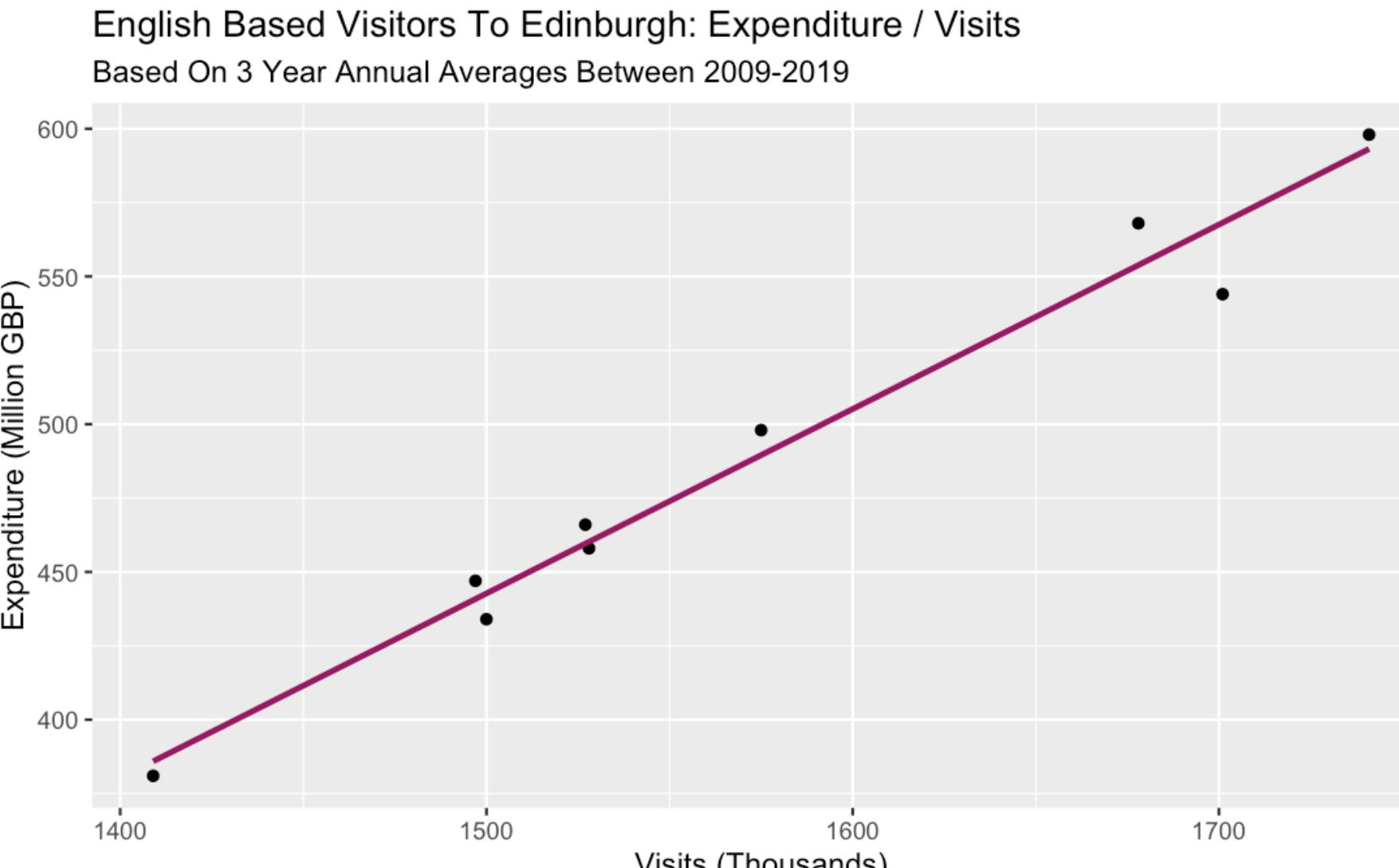
Mini Case Study, Pt. 1



- **Visits:** Higher annual visitor numbers from England, although with a wider distribution/more variation.
- **Spend Per Visit:** Higher average expenditure per visit among visitors from England.
- **Nights:** Longer stay per visit among visitors from England.

Marketing Edinburgh To Domestic Tourists:

Mini Case Study, Pt. 2



Model: spend ~ visits

Correlation: 0.98 (Very strong positive correlation)

B1 Estimate: 0.62423

R-squared: 0.9728

Residual Standard Error: 12.34

p-value: 9.76e-07 (0.000000976)

Question:

The numbers for each region are calculated by taking a three-year average. The highest increase in subsequent three-year averages since 2009 was approximately 6% (as indicated by 2009-2011 - 2010-2012). Visit Scotland aims to replicate this increase in the next set of visitor numbers, resulting in an average of around 1803 thousand visitors. They are interested in determining the corresponding expenditure if they achieve their objective.

Answer:

If visits were increased as above, the model predicts an expenditure of ~632 Million GBP (Low Estimate ~620, High Estimate ~644).

Practical Application:

Visit Scotland could use this information when determining the appropriate marketing budget to attract more English-based tourists to Edinburgh.



INTERNATIONAL TOURISM



International Tourism

International vs. Domestic Tourism

Between 2009 and 2019 international tourism to Scotland made up 18% of visits and 39% of expenditure.

Visits (All Purposes / 2009-2019):

Domestic Annual Visits (Mean): 12,333,136
International Annual Visits (Mean): 2,795,579
Total: 15,128,715

Expenditure (All Purposes / 2009-2019):

Domestic Annual Expenditure (Mean): ~2899 Million (GBP)
International Annual Expenditure (Mean): ~1843 Million (GBP)
Total: ~4742 Million (GBP)

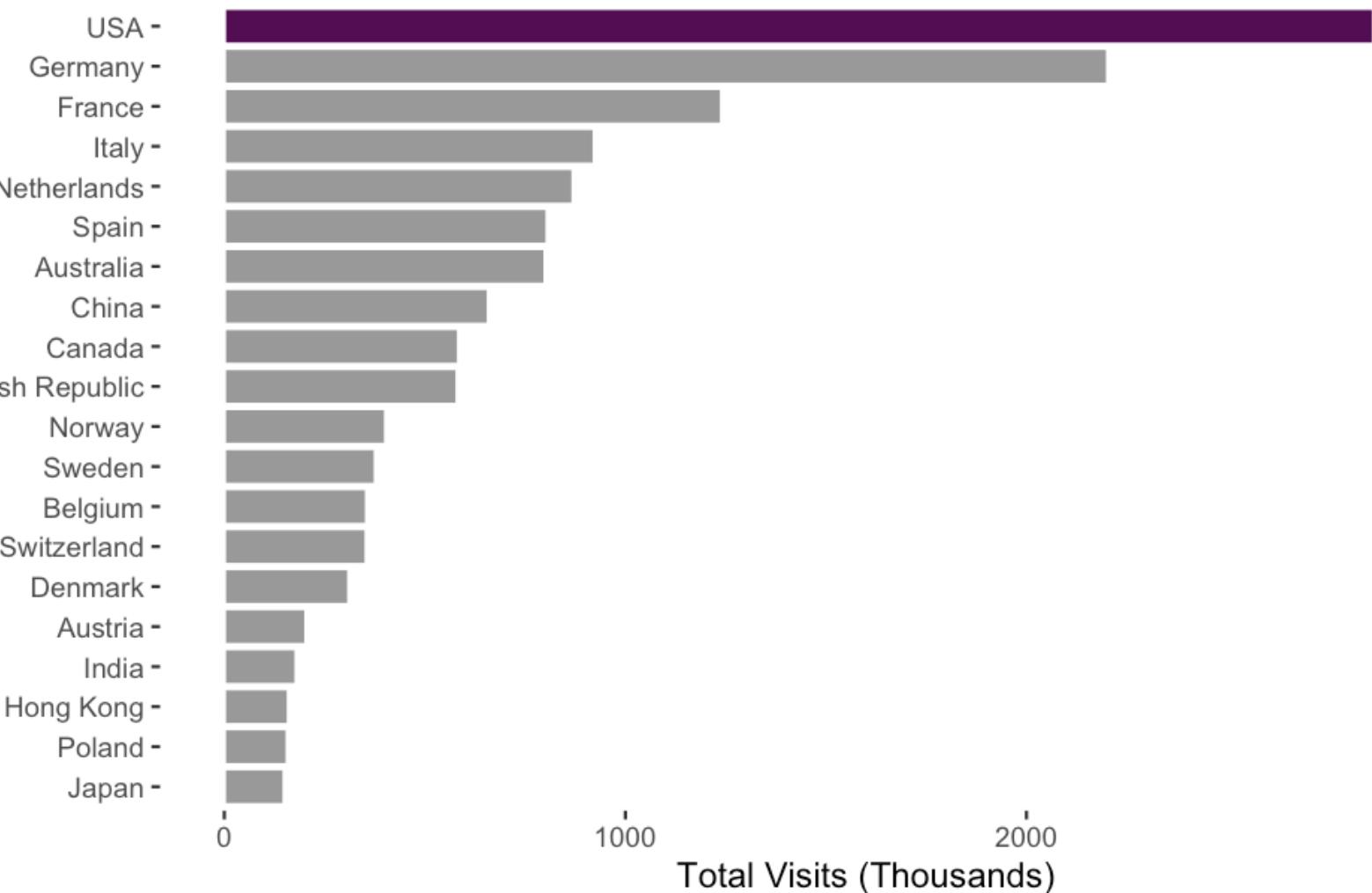
International Tourism

Total Visits and Total Expenditure (Holiday Only)

International Tourism: Total Visits (2002-2009)

Top 20 (Holiday Only)

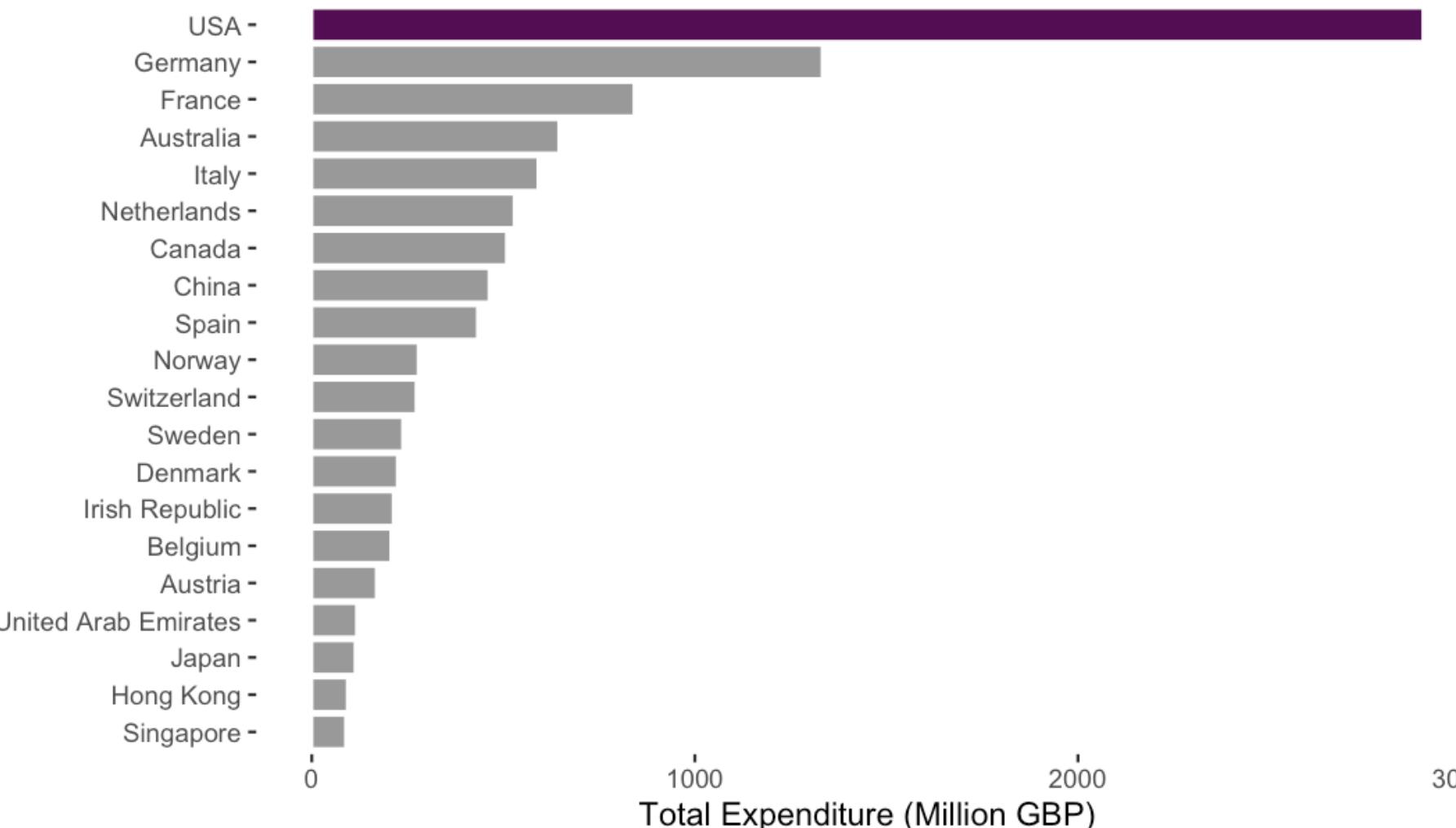
Country



International Tourism: Total Expenditure (2002-2009)

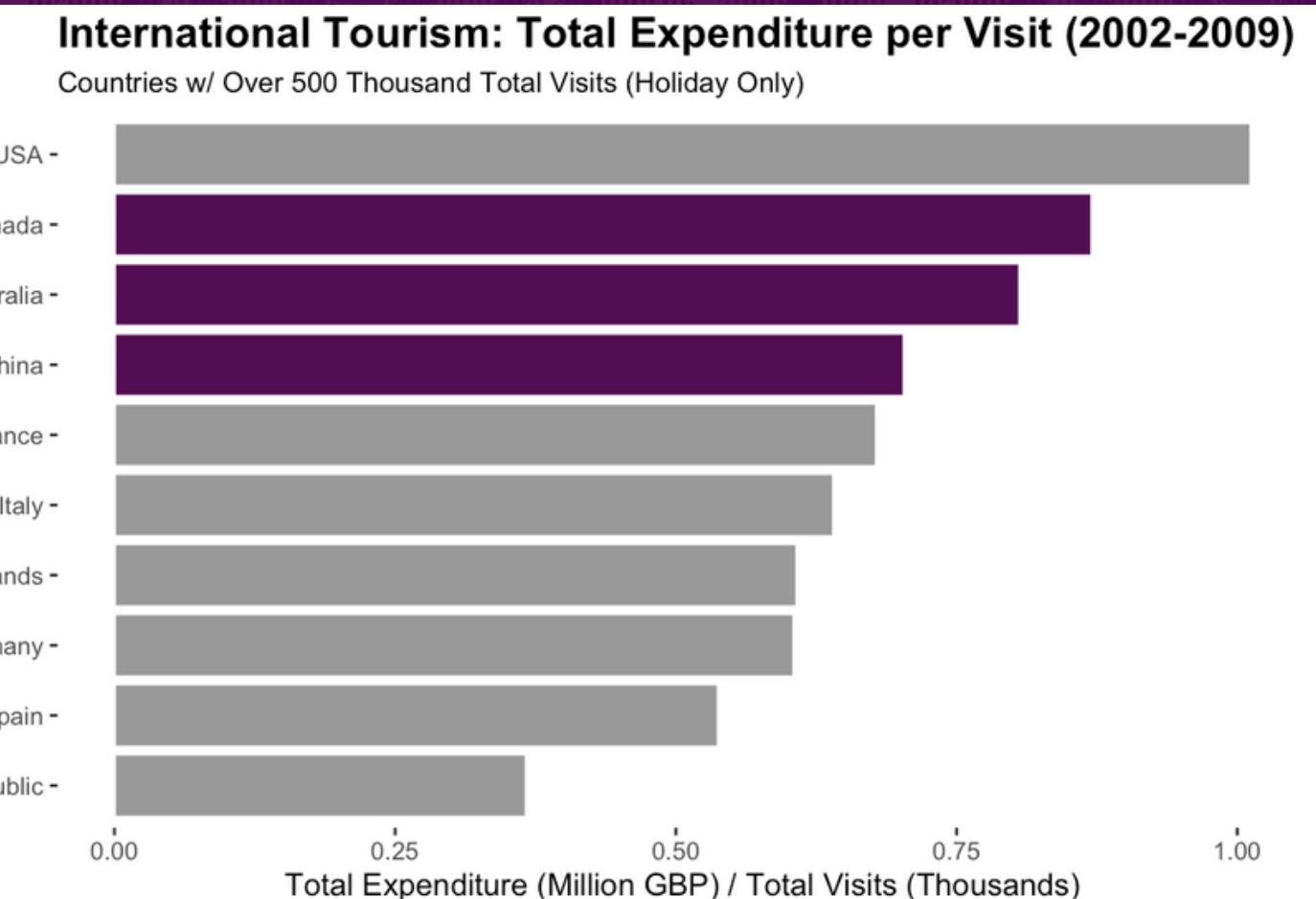
Top 20 (Holiday Only)

Country

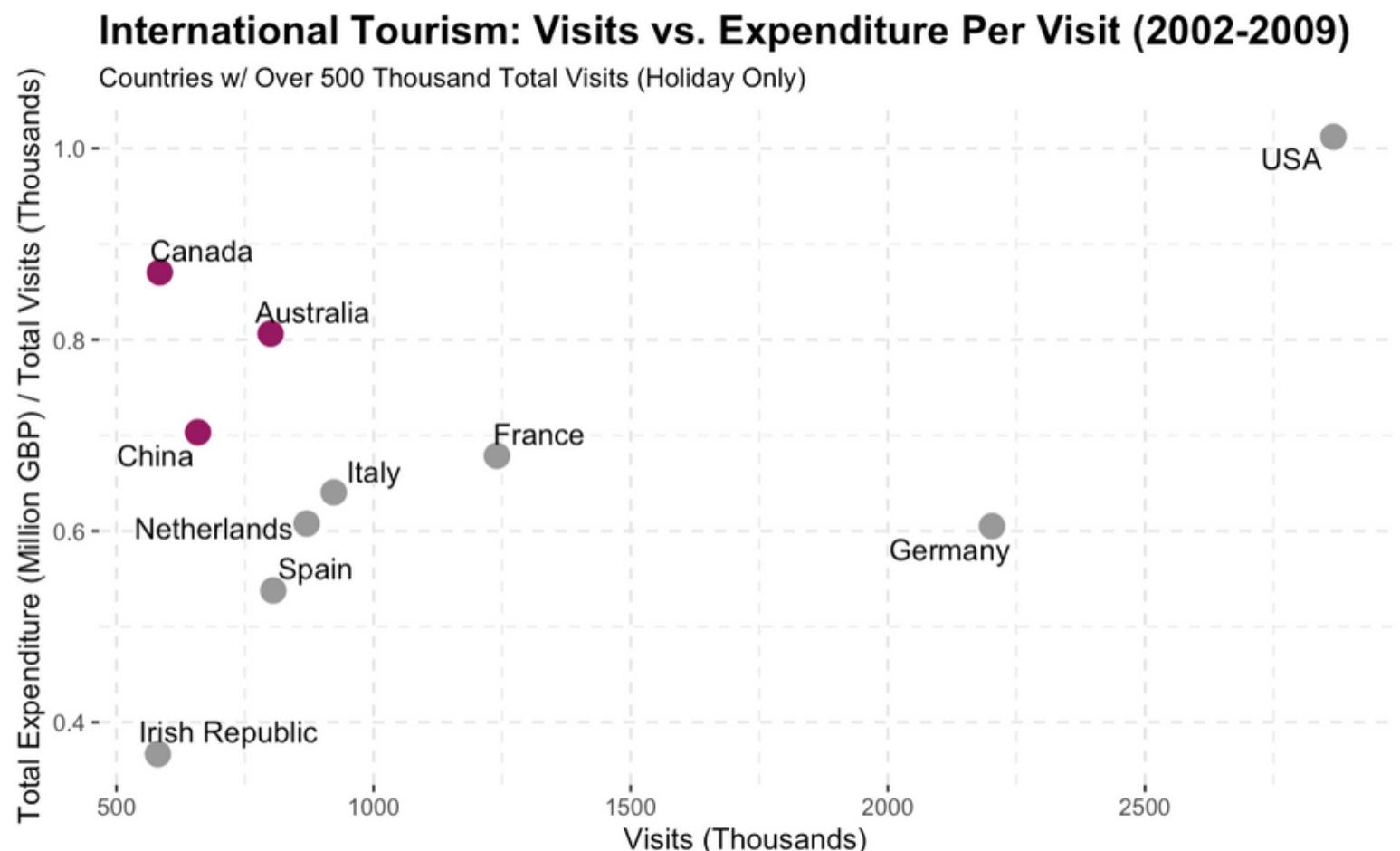


International Tourism Expenditure per Visit (2002 / 2019)

Countries w/ Over 500,000 Total Holiday Visits

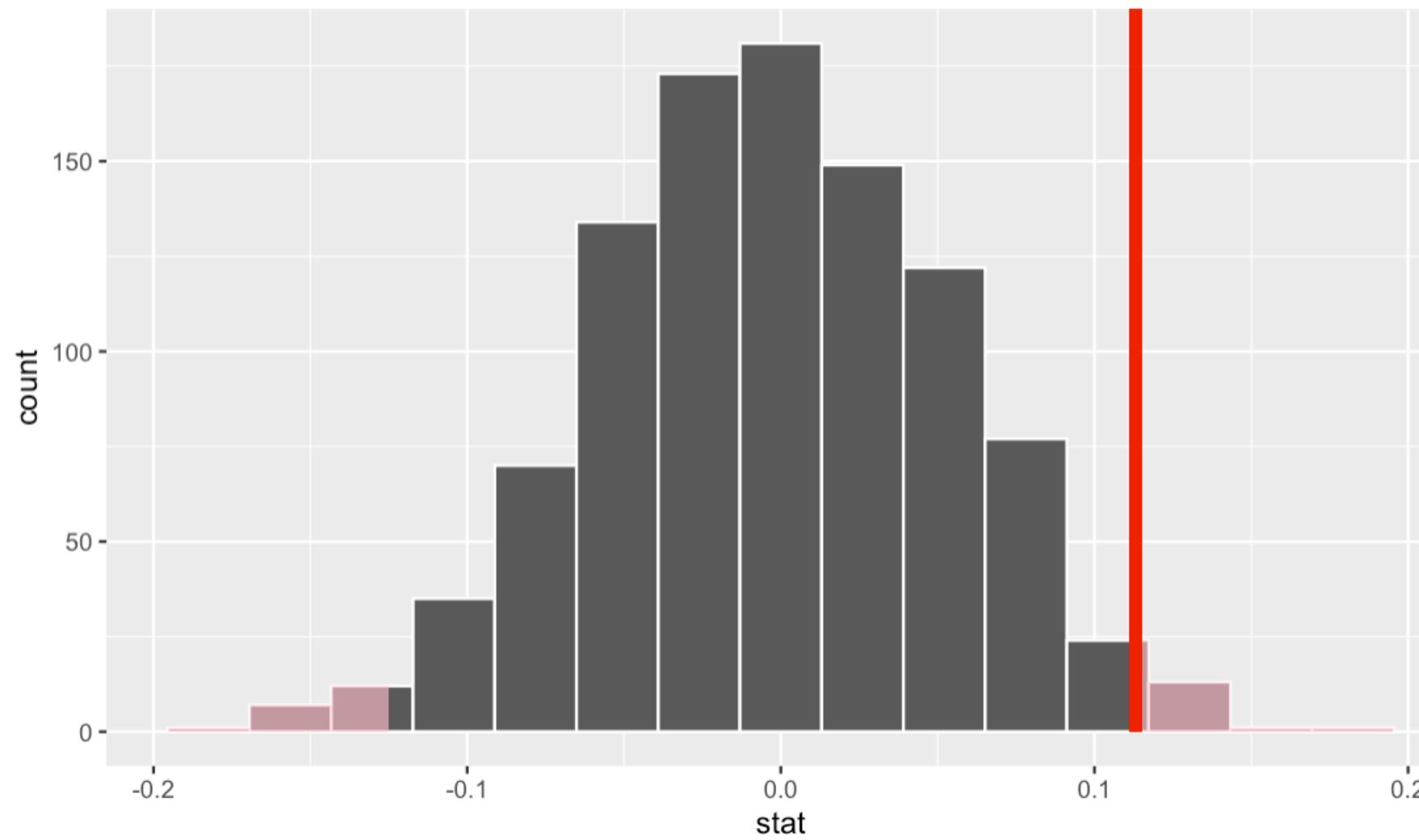


- Although **Canada, Australia and China** have lower visitor numbers than the USA they have a high spend per visit.
- It may be worth considering targeting marketing efforts towards these countries in order to increase visits.



Marketing Scotland To Canadian Based Tourists: Mini Case Study

Simulation-Based Null Distribution



Test: Two Sample Mean Test

$$H_0: \mu_{\text{spend per visit}(Q1+Q4)} - \mu_{\text{spend per visit}(Q2+Q3)} = 0$$

$$H_a: \mu_{\text{spend per visit}(Q1+Q4)} - \mu_{\text{spend per visit}(Q2+Q3)} \neq 0$$

Significance Level: $\alpha=0.05$

Observed Difference in Means: 0.1130621

p-value: 0.034

Question:

Visit Scotland is exploring a new marketing strategy to attract more Canadian-based tourists to Scotland. They want to understand whether Canadian-based visitors' spending habits vary depending on the season. This information will guide their marketing approach and help them maximise the economic benefits of increased visitors.

Answer:

Based on the evidence, we reject H_0 as the p-value is lower than our significance level. This indicates a statistically significant difference in the spend per visit of Canadian-based visitors between Autumn/Winter (Q1/Q4) visitors and (Q2/Q3) visitors.

Practical Application:

Visit Scotland could use this to support future data-driven decision-making on marketing direction, for example by targeting increased visits during a specific season.



CONCLUSION

Conclusion

How have tourism rates changed over time?

- The overall trend in domestic and international visitor numbers is stable, but there have been recent **rises in domestic visitors** and **declines in international visitors**.
- Both domestic and international **expenditure has increased**, with international spending rising at a greater rate.

When looking at regional tourism, what insights can we gain?

- Edinburgh, Glasgow and the Highlands have the highest average visitor numbers and expenditure.
- Island regions have the highest expenditure per visit, with longer average stays per visit than other regions, a potential factor.
- Edinburgh consistently returns the highest Gross Value Added.

Where are our visitors from? Do they differ in the money they spend or the number of visits?

- International visitors make up **18%** of visits but **39%** of expenditure.
- The **USA** makes up the **most visits** and the **highest level of expenditure**.
- Canada, Australia and China have the **highest spend per visit outside the USA**.

Practical Applications / Data-Driven Decision Making

- Insights should be used to inform a **data-driven approach** to decision-making.
- **Linear Regression** has been used to demonstrate how spending could be predicted and used to inform marketing budgets.
- **Hypothesis testing** has demonstrated how marketing could be targeted to maximise economic benefit.

Challenges / Future Development

Challenges:

Challenge: Analysing **aggregate data** to uncover significant insights can be challenging, including when different aggregation methods have been used, leading to a more complex comparison between data sets.

Approach: I took the necessary steps of **wrangling** and **cleaning** the data to ensure it was in a form that would support the analysis I wanted to conduct. I also carefully examined the data in each available dataset and made informed decisions about which data to utilise.

Challenge: Differentiation in data available for **day visits** and **overnight visits**.

Approach: In light of the limited time frame for analysis and presentation, I **narrowed my focus** to data about **overnight visits** for this project. This also helped to ensure that I wasn't taking too broad an approach and focussing on actionable insights in the areas of interest.

Challenge: The impact of the **Covid-19** pandemic on data collection and methodology, impacting the ability for comparison.

Approach: Given the limited time frame for analysis and presentation, I decided to **narrow my focus** to data **up until and including 2019**.

Future Development / If I Had More Time:

- Explore the possibility of using **clustering methods** to identify target markets with the potential for high-value return. Although **K-means clustering** was initially explored, it still requires further work.
- Investigate the potential applications of **sentiment analysis** of Scotland's visitors based on their region and country of origin.



Thank you for listening!