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Research Report

Can Limiting Tourist Access Preserve Value? Evidence from the 2017 Visitor Management Reforms at Machu Picchu

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Date: September 1, 2026

STUDENT LIFE | Centre for International Experience

UNIVERSITY OF TORONTO

Acknowledgements

I would like to express my most sincere gratitude to my research advisor, Dr. Nicholas Zammit, the Laidlaw Scholars Foundation, and the University of Toronto Laidlaw Scholars Programme. Without your support and guidance this research experience would not have been possible.

Abstract

This research analyzes if the visitor management reforms that the Peruvian government introduced for Machu Picchu in July 2017 either a) impacted regional GDP and/or b) slowed tourism growth. Methods used include a segmented regression on monthly visitor data throughout the period 2012 to 2019, a pooled difference-in-differences analysis that compares the region of Cusco with Puno and Arequipa regarding economic activities and GDP, a counterfactual trend projection that compares the pre- and post-reform economic and tourism growth trends, and the calculation of correlations and regressions of GDP data by economic sectors. Datasets used in this study were retrieved from INEI, MINCETUR, and other official Peruvian government websites, all publicly available online. The study found no statistically significant difference in visitor growth before and after the policy implementation in 2017. In fact, numbers post-policy implementation grew for two years consecutively. The study also found no significant difference between Cusco's total GDP and that of the two comparator provinces. The study did prove that tourism volumes are strongly correlated with tourism GDP in Cusco, but that tourism GDP does not have a notable influence on Cusco's regional GDP. The research findings suggest that reforms aimed at redistributing tourism flows in Machu Picchu do not have negative implications on economic or tourism growth. The case of Machu Picchu and its history of tourism management reforms can inform other UNESCO World Heritage Sites challenged by overtourism.

Introduction

Machu Picchu is located in Aguas Calientes, Cusco, Peru. In 1983, UNESCO named it a World Heritage Site for its natural and cultural value.

As a centralized country, Peru's capital, Lima, contributes nearly 50% to national GDP. Lima is the main point of international arrivals and therefore dominates the hospitality sector and concentrates most public services. Nonetheless, Cusco constitutes the main touristic destination within Peru as of 2025, receiving 4.5 million tourists in 2025 as opposed to the 2.7 million visitors that Lima welcomed in that same year (MINCETUR, 2025).

As one of the 7 New World Wonders, Machu Picchu attracts over a million tourists every year. In 2019, Machu Picchu received a record of 1,585,262 visitors. This number then shrank due to COVID-19. Post-pandemic tourism volumes in Cusco have been growing, but they have not yet reached pre-pandemic levels.

The large volume of visitors poses serious challenges to conservation and long-term sustainability. On the one hand, global conservation officials have asked Peruvian authorities to limit the number of visitors and exciding the site's carrying capacity. On the other hand, the economic gains from tourism-related economic activity and the popularity of the site across digital media channels benefit regional and national economic growth.

To find a balance between conservation and economic development, the Peruvian government has been periodically introducing new management reforms and policies for Machu Picchu. Below is a chronological summary of key policies and events in the Machu Picchu National Historic Sanctuary (SHM) from 1981 to the first half of 2026.

1981: National recognition
The Peruvian government officially established the Machu Picchu National Historic Sanctuary (SHM), establishing a legal framework for the conservation of its 32,592 hectares (Ministerio del Ambiente, 2015).

1983: UNESCO recognition
UNESCO recognized Machu as a World Mixed Heritage site (cultural and natural value), demanding regular reporting of the conservation status (UNESCO, 1983).

1992-2002: Post-terrorism
Tourism grew exponentially after the eradication of terrorism in Peru, and UNESCO reacted to this growing tourism by recommending a daily capacity for the site of 2,000 visitors (UNESCO, 2002).

2003: Law No. 28100
The Peruvian government promulgated Law No. 28100, which mandated that 10% of all admission revenue from SHM be transferred directly to the local municipality (Congreso de la República, 2003).

2005–2010: Master Plan (2005-2010)
The Peruvian Government approved the Master Plan (2005-2010), establishing a visitor limit of 2,500 per day for the citadel and 500 for the Inca Trail (Ministerio de Cultura, 2005)

2015: Carrying capacity

Research determined that the technical baseline for sustainable tourism in Machu Picchu was 2,244 visitors per day (Comer, 2015).

2016: New site exit
A new exit of the SHM was inaugurated, directly reducing congestion at the site (Ministerio de Cultura, 2020).

2017: Visitor management reform (Ministerial Resolution No. 070-2017-MC)
The Ministry of Culture passed the Ministerial Resolution No. 070-2017-MC on July 1, 2017. This measure introduced two differentiated entry shifts: morning block from 6am to 12pm and afternoon block from 12pm to 5:30pm. It also introduced the requirement for visitors to enter the site with a certified guide in groups of maximum 16 people and eliminated the option to re-enter once visitors leave the site (Ministerio de Cultura, 2017).

2018: Time limit (Resolution No. 216-2028-MC)
The Ministry of Culture established a maximum stay of 4 hours per visitor to prevent exceeding the physical capacity of the site (Ministerio de Cultura, 2018).

2019: Historical visitor record
SHM received an all-time record of 1,585,262 visitors (MINCETUR, 2020). In response, UNESCO urged Peru to respect the site's capacity limits determined in 2015 and promote other touristic destinations in Cusco beyond Machu Picchu citadel (UNESCO, 2019).

2020: COVID-19
According to Ministerial Resolution No. 173-2020-MC, Machu Picchu's visitor limit was capped at 2,244 daily visitors based on the 2015 study findings (Ministerio de Cultura, 2020).

2021: Site reopening (Resolution No. 263-2021-DM/MC)
SHM was completely closed from January 31 to February 28, 2021, due to COVID-19. The site reopened on March 1 with a capacity of 40%. The Ministry of Culture increased admission capacity to 3,044 daily visitors in October 2021, although total visits for the year (461,120) represented only 29.1% of pre-pandemic 2019 levels (Ministerio de Cultura, 2021).

2022: State of emergency
The Peruvian government declared the tourism sector in a state of emergency. From July to December 2022, the Machu Picchu Management Unit (UGM) increased capacity limits exceptionally from 3,044 to 4,044 visitors per day. This new limit helped more than double the 2021 tourist count, closing the year with 1.04 million visits (MINCETUR, 2022).

2023: Political protests (Resolution No. 528-2023-MC)
The Peruvian government suspended entry to SHM from January 21 to February 15, 2023, due to political unrest and protests in the southern regions of Peru. Consequently, annual visits dropped to 955,741, representing an 8% decrease compared to 2022. In response, the government pushed for the online sale of tickets to improve predictability regarding SHM's opening dates. Additionally, the capacity limit was kept at 4,044 daily visitors as per Resolution No. 528-2023-MC (Ministerio de Cultura, 2023).

2024: Dynamic capacity limit (Resolution N° 000207-2024-MC)
The Peruvian Government introduced a dynamic capacity limit, increasing the cap to 4,500 visitors during regular season and 5,600 visitors during peak season. It also implemented three entry slots (6-9am, 9am-12pm, and 12-3pm) and reduced groups to 10 people per guide through Resolution No. 000207-2024-MC (Ministerio de Cultura, 2024).

2025: Warning from New7Wonders
New7Wonders warned Peruvian authorities that Machu Picchu could lose its "Wonder" status because of corruption, political instability, conservation mismanagement, and safety concerns, including train collisions (El País, 2026).

2026: Master Plan (2026-2030)
The Peruvian government approved the New Master Plan (2026-2030) to address climate change and infrastructure concerns. This plan sets a daily capacity of 5,600 visitors for high peak dates, including Peru Independence Day or New Year, and 4,500 visitors otherwise. Moreover, bookings for SHM are now done online 1 to 3 months in advance (Ministerio de Cultura, 2026).

Methods

This research was used a mixed methods approach, where qualitative data (policy briefs, ministerial resolutions, UNESCO reports) were analyzed in the context of tourism volume data and economic indicators. The statistical analysis of this research was conducted through IBM SPSS Statistics. Quantitative methods included segmented regression of monthly visitor numbers, a Difference-in-Differences analysis of Cusco and comparator provinces, a counterfactual trend projection of economic and tourism growth, and the calculation of correlations for sectoral GDP and tourism volumes.

Data sources:

This study relied on secondary data found on official Peruvian government websites. Datasets showing tourism volumes in SHM were found through the Ministry of Foreign Commerce and Tourism (MINCETUR), while data on GDP, economic, and demographic data from Cusco, Puno and Arequipa, was retrieved from the National Institute of Statistics and Informatics (INEI). Policy and management reform information for SHM was compiled mainly from the Ministry of Culture and UNESCO websites.

Results

Overview:

Based on statistics from the Ministry of Foreign Commerce and Tourism (MINCETUR) showing foreign, national, and total visitor numbers, Machu Picchu received a mean of 1,085,600 total yearly visitors between the years 2007 and 2025. The mean of foreign tourists was 308,153, while the mean of national tourists was 777,444 over the same period.

Figure 1 shows three differentiated regions: tourism growth from 2007 to 2016 (with two declines in 2010 and 2017), a sharp decline in 2020 and 2021 due to COVID-19, and a recovery period beginning in 2022, which has not yet reached pre-pandemic levels.

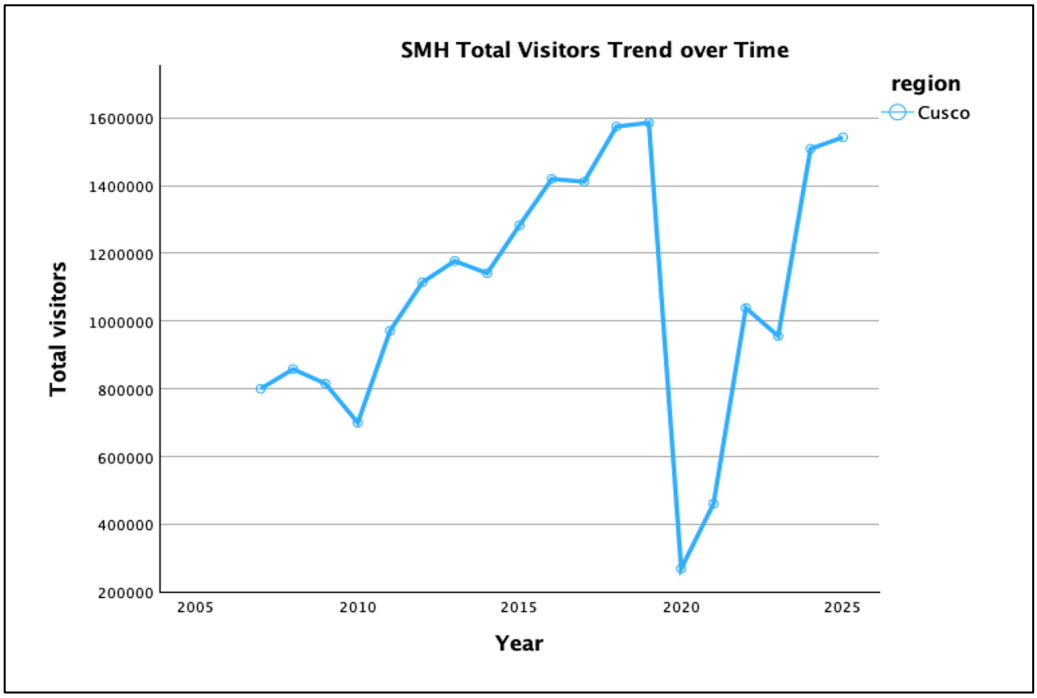


Figure 1. Total visitors trend line in Machu Picchu from year 2007 to 2025.

Before COVID-19, the only years with a dip in tourism volumes with respect to the previous year were 2009, 2010, 2014, 2017. After the sharp decline in tourism in 2020, visitor numbers went up steadily, except for 2023 that experienced a slight decline.

Relevant to this study are the years that are closest to 2017 and the COVID-19 pandemic. The yearly growth rate of tourism was negative in 2017 with -0.58% and 2020 with -82.99%. Regarding positive growth, 2018 showed an increase of 11.5% compared to the previous year level. After the management reforms in Machu Picchu, tourism grew from 1,411,279 visitors in 2017 to 1,574,076 visitors in 2018.

Segmented regression:

Did July 2017 reform cause a break in visitor numbers? To answer this question, a segmented regression was used. Data in the model included monthly totals from 2012 to 2019. Three variables were computed: *t* (time in months), *post* (binary indicator; 1 = month of or after July 2017), and *post_t* (interaction of two previous variables to capture the change in slope of visitor growth). Months were taken as fixed to account for seasonality. An OLS regression of monthly visitors was performed on each of the three variables. The coefficients from this segmented regression are shown in Table 1. For full model results, refer to Appendix B.

Table 1. Segmented regression coefficients for variables *t, post*, and *post_t*

Parameter	**OLS**		**Month-adjusted General Linear Model**	
	Beta	**Significance**	**Beta**	**Significance**
t (monthly trend)	5,685	$p < 0.001$	5,732.2	$p < 0.001$
post (break)	15,787.2	$p = 0.942$	-17,048.4	$p = 0.935$
post_t (slope break)	67.3	$p = 0.951$	246.9	$p = 0.814$

Based on these results, both specifications coincide in showing that monthly growth is large (5,685 and 5,732.2) and highly significant ($p < 0.001$). However, neither the *post* nor *post_t* parameters are significant. This means that accounting for the growth trend that existed before July 2017, there is no evidence that is statistically significant to prove that the policy reform of July 2017 caused a sudden decrease in visitor numbers or significant impact in the growth rate for the months to follow. When looking at the raw annual data (Appendix A), the decrease in visitor numbers between 2017 and 2018 is not large relative to the monthly variations for the same time period.

When plotting visitor volumes between 2012 and 2019, there is no visual evidence of the July 2017 policy effect in controlling visitor numbers (Figure 2). This is confirmed through the trend line graph by the growth in visitor numbers after the policy implementation and the lack of an interruption or a decrease in the number of visitors.

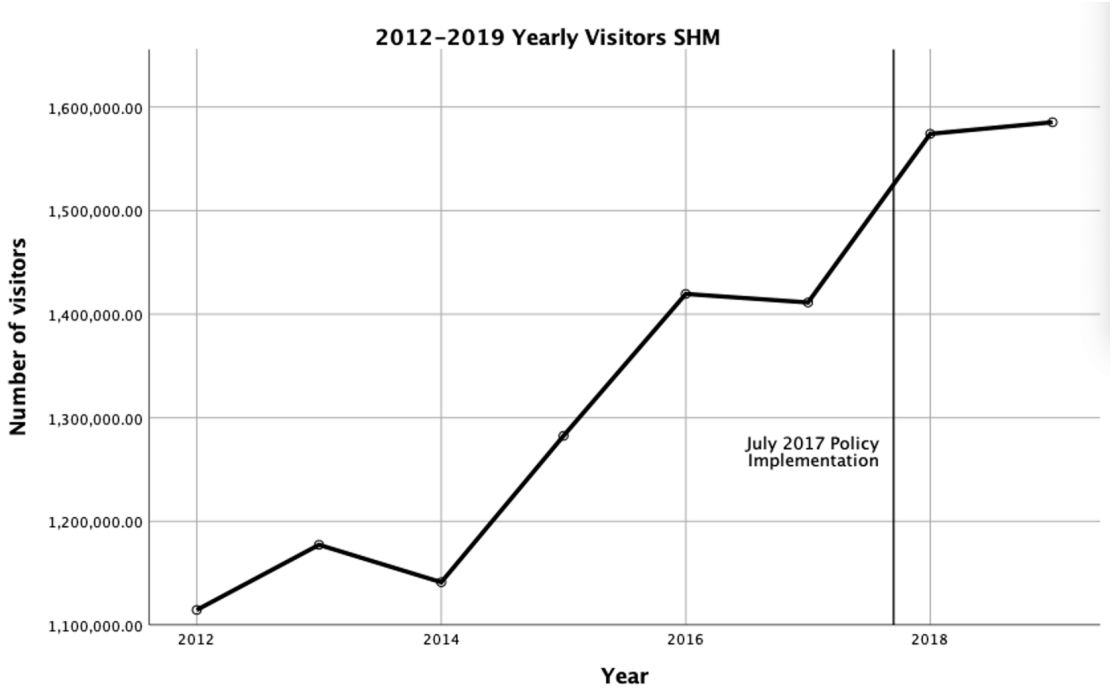


Figure 2: Trend line showing yearly visitors to SHM between 2012 and 2019 with a reference line for July 2017.

Differences-in-Differences (D-i-D):

A pooled D-i-D analysis evaluated the question, "Are the reform period or post-reform period linked to a change in Cusco's economy relative to two comparator regions: Puno and Arequipa? Puno and Arequipa are the two provinces chosen for this analysis given their cultural and tourism significance in Peru. However, this selection still carried limitations associated with geographical location, access to services, transportation routes, differentiated economic activities, among other factors.

The dependent variable was "GDP total" and there were 3 predictors: *treatment* (1 = Cusco), *post2017* (1 = year >= 2017), and the interaction of the previous two variables. For robustness checks, Cusco was first compared to each province separately, and second, the sample data was split and compared between pre-COVID (2007-2019) and post-COVID (2021-2024) periods.

This model uses pooling for the independent, repeated cross-sectional data that was sampled over multiple time periods by the National Institute of Statistics and Informatics (INEI). The results of this comparison between Cusco, Puno, and Arequipa are found in Table 2.

Table 2. Results from regressing GDP variables on Cusco, post2017, and DiD.

	Treatment	**Post2017**	**D-i-D**

Dependent variable	Beta	Significance	Beta	Significance	Beta	Significance
GDP total	2,512,644	p = 0.413	5,679,627	p = 0.031	-1,221,859	p = 0.784
GDP tourism	376,201	p < 0.001	47,751	p = 0.420	35,433	p = 0.729
GDP growth	3.853	p = 0.512	-2.651	p = 0.577	-5.285	p = 0.528
GDP tourism growth	1.498	p = 0.875	-2.295	p = 0.766	-1.339	p = 0.922

The Difference-in-Difference interaction across these 4 outcomes (GDP total, GDP tourism, GDP growth, and GDP tourism growth) is not statistically significant, since p > 0.001. The only exception is GDP tourism, for which treatment is significant. This result makes sense because the tourism sector in Cusco is larger than the one in Puno or Arequipa). This statistical significance is expected and does not constitute evidence of the effect of July 2017 policy reform. The variable post2017 is significant only for GDP total, which reflects a common growth trend across regions after 2017. The increase in GDP total level is not particular to Cusco, but it is shared by the three provinces.

Robustness check:

Comparison across 3 provinces:
Comparing Cusco with each province separately, first for Arequipa and then for Puno, Table 3 shows the growth path differences across the regions. See Appendix C for complete regression.

Table 3. Robustness check comparison of Cusco with Arequipa and Puno separately.

Comparison	Treatment		Post2017		D-i-D	
	Beta	Significance	Beta	Significance	Beta	Significance
Cusco vs. Arequipa	-4,557,843	p = 0.001	9,097,651	p < 0.001	-4,639,884	p = 0.020
Cusco vs. Puno	9,583,131	p < 0.001	2,261,602	p = 0.035	2,196,165	p = 0.141

When comparing Cusco against Puno, the coefficient is positive and non-significant. For the comparison between Cusco and Arequipa, the DiD coefficient is significant and negative against Arequipa, which suggests that the GDP level of Cusco grew relatively less than the GDP level of Arequipa after 2017. This can be explained by Arequipa's rapid growth just before 2017 driven by investment in mining. This result is congruent with Arequipa's higher GDP mining level, and therefore, this comparison is not robust causal evidence.

Comparison across time periods:
The comparison in Table 4 distinguishes between pre-COVID and post-COVID years. See Appendix D for complete regression.

Table 4. Robustness check comparison of pre-COVID and post-COVID time periods.

Comparison	Treatment		Post2017		D-i-D	
	Beta	Significance	Beta	Significance	Beta	Significance
2007-2019	2,512,644	p = 0393	5,824,934	p = 0.104	-1,174,779	p = 0.847
2021-2024					1,315,242	p = 0.826

The results from this comparison show that D-i-D still remains small and not significant. For the time period between 2021 and 2024, all rows already had post2017 = 1, which excluded treatment and post2017 from the model.

The lack of significance found through both robustness checks confirms that there is no statistically detectable effect of pooled D-i-D.

Parallel trends:

Between 2007 and 2016, the GDP level of Cusco, Arequipa, and Puno showed an upward trend, with Cusco growing 88% and Arequipa, 33%. Notably, Arequipa had an accelerated growth period in 2016, and the growth trend diverged from the trend in GDP total level in Puno and Cusco (Figure 3). The parallel trends assumption for D-i-D is not fully satisfied, and Puno against Cusco is a more consistent comparison than Arequipa against Cusco. This result, which aligns with the robustness by department check (Table 3), is a limitation of the model.

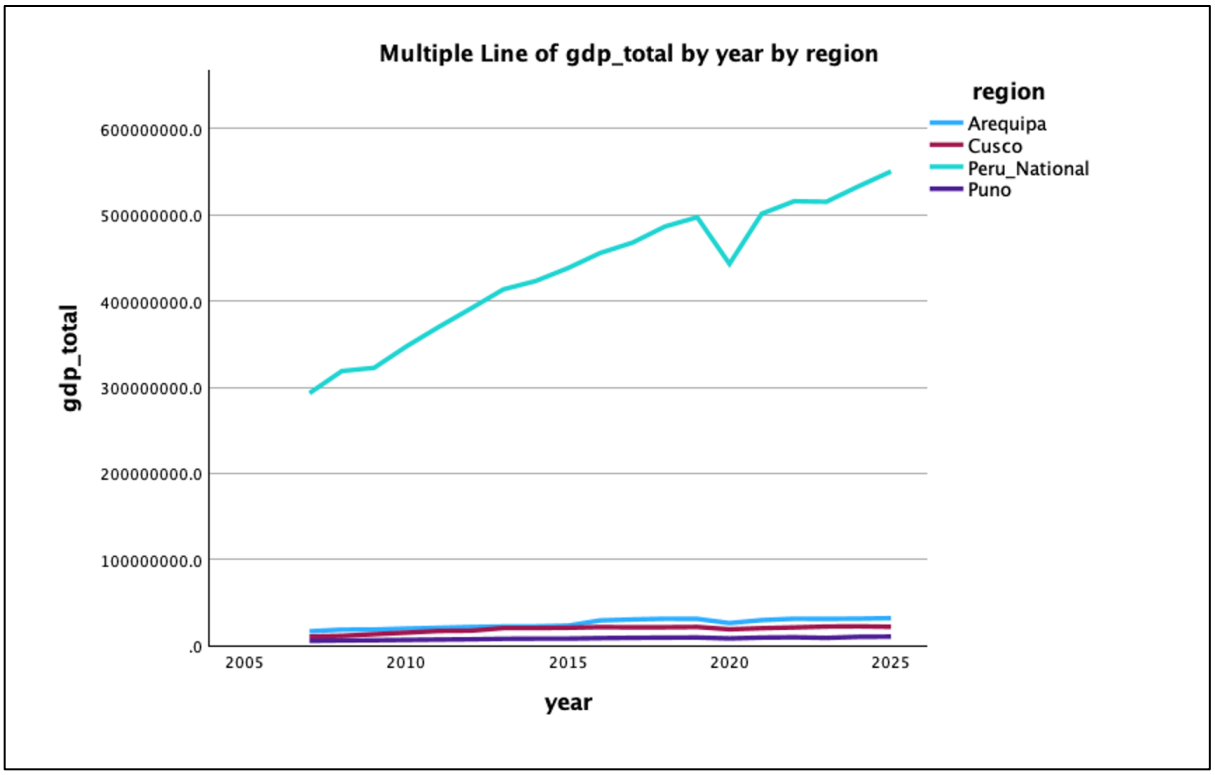


Figure 3. Line chart of total GDP level by year and by region (Arequipa, Cusco, and Puno).

Projected vs Actual Growth:

The counterfactual trend projection used the question, "If there was no 2017 reform, what would tourism and economic growth would have looked like based on the pre-policy growth trends?" An OLS regression used data from 2007 to 2016, which was then extrapolated forward to obtain the trend trajectory. Data from 2017 to 2020 (dates that lie after the policy introduction and before the start of COVID-19) was compared against the projected trend to calculate the gap between projected versus actual values. Results are shown in Table 5.

Table 5. Counterfactual trend projections and gap between actual and projected visitors.

Year	Actual visitors	Projected visitors	Gap	Gap (%)
2017	1,411,279	1,419,639	-8,360	-0.6%
2018	1,574,076	1,490,845	+83,231	+5.6%
2019	1,585,262	1,562,051	+23,211	+1.5%
2020	269,576	1,630,000	-1,360,424	-72%

For 2018 and 2019, both years for which pre-Covid clean data exist, the actual visitor numbers were slightly above the numbers projected by the pre-existing growth trend. There is no evidence of the policy reform decreasing or limiting visitor levels and growth below the pre-existing trend. The only negative gap corresponds to 2020 and the effects of COVID-19, when Machu Picchu was completely closed to the public for several months. This negative growth is not attributable to the policy.

This gap in actual versus projected visitors is plotted in Figure 4, where the vertical black lines represent actual visitors and the upward, diagonal, pink line represents projected visitors.

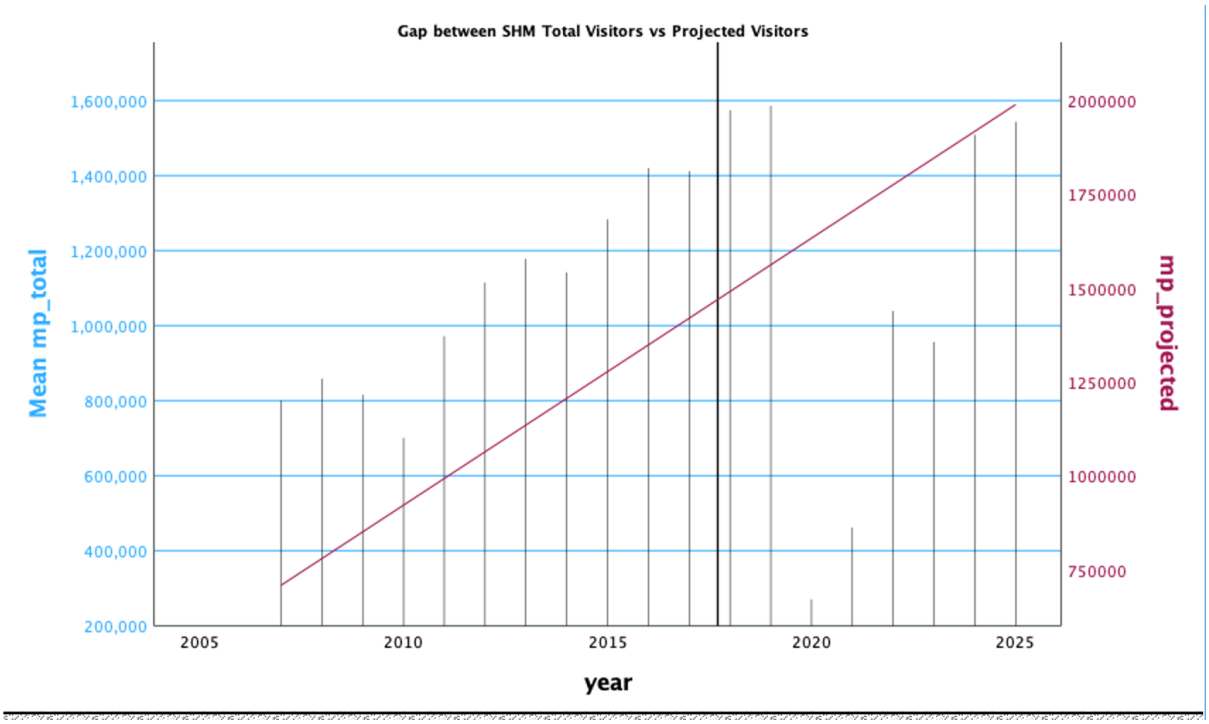


Figure 4. Actual versus projected visitor numbers in Machu Picchu between 2007 and 2025.

Alongside the visitor volume gap, a tourism-sector GDP gap was also calculated. Using data from INEI on the sectoral GDP breakdown data in the Cusco region, which accounted for accommodation and restaurants, a pre-trend model was created. With $R^2 = 0.978$, this model has an excellent fit. The projected GDP tourism level was -92,782,150.2 + 46,469.588 x year

Regressing GDP tourism on both Machu Picchu total visitors and the year confirmed that the factor driving the tourism sector is indeed visitor numbers and not simply time. The number of visitors in Machu Picchu (variable titled "mp_total") is highly significant ($B = 0.372$, $p < 0.001$) and year becomes not significant when mp_total is included in the model ($B = 4{,}356$, $p = 0.138$). Hence, there is a strong positive linear correlation between visitors and tourism GDP.

Figure 5 shows the actual versus projected tourism GDP, where the vertical black lines represent actual tourism GDP and the upward, diagonal, pink line represents projected tourism GDP.

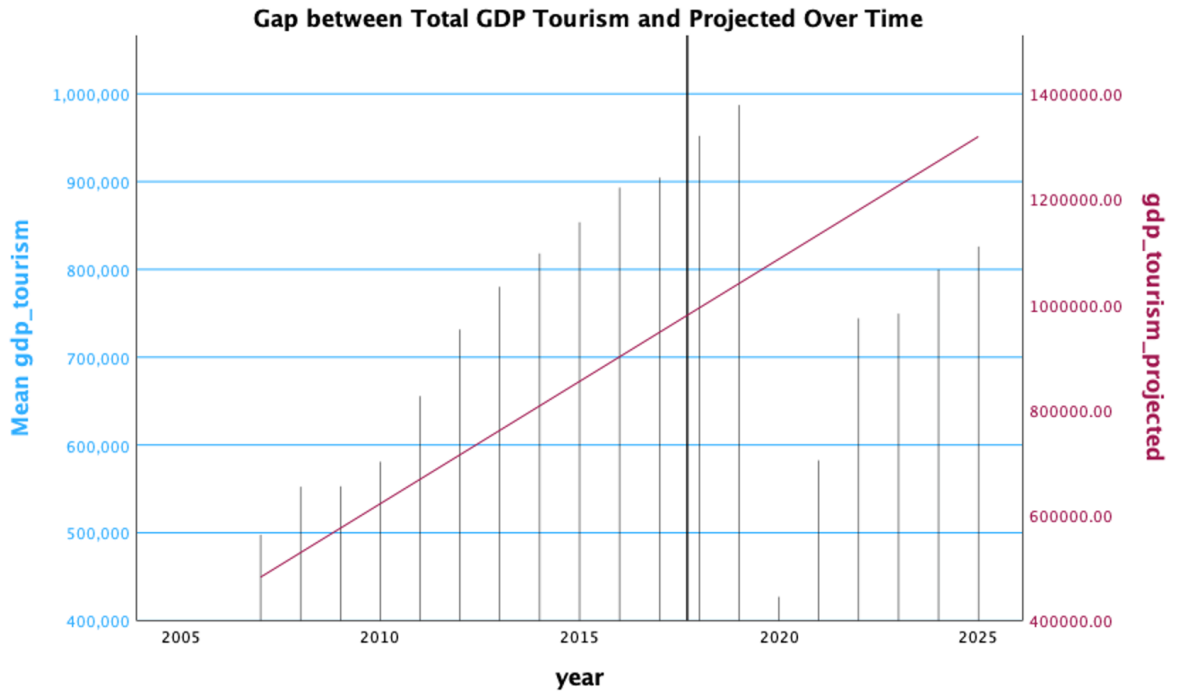


Figure 5. Actual versus projected tourism GDP in Cusco between 2007 and 2025.

Employment comparison:

Data from INEI on unemployment levels were only available beginning in 2022. This section does not suggest any causal pre and post policy implications due to the limited data, but rather provides a descriptive comparison of unemployment parameters across the three provinces (Table 6).

Table 6. Mean unemployment, informality, and Economically Active Population (PEA) across 3 provinces and Peru total.

Province	Mean unemployment (%)	Mean informality (%)	Mean PEA (thousands)
Cusco	3.89	80.09	808.1
Puno	3.93	88.79	716.4
Arequipa	6.30	64.27	785.3
Peru (national)	5.20		

Between 2022 and 2024, the unemployment rate of Cusco of 3.89% was the lowest out of the tree provinces and was below the national average of 5.20%. The mean unemployment in Puno of 3.93% is very close to that of Cusco. Nonetheless, the informality rate of Cusco (80.09%) is well above the informality rate of Arequipa (64.27%) and lower than that of Puno (88.79%). In other words, Cusco is characterized by a labor market there is low formal joblessness but a large proportion of employment falls under informality. This description is consistent with the

tourism-dependent economy of the province that relies on activities in the informal sector, such as tour guiding services, food and lodging, handicrafts, and unregulated transportation. None of these results can be causally connected to the 2017 policy reform. All calculations for this subsection are found on Appendix F.

Correlation between GDP sectors:

Pearson correlations were calculated between Machu Picchu visitors and sectoral GDP in Cusco to answer the question, "Which economic sectors are influenced by tourism volumes?" Economic sectors included tourism, transport, commerce, mining, construction, agriculture, and manufacturing.

As shown in Table 7, tourism is by far the sector most strongly correlated to visitor volumes, as expected. For a full list of pairs with their correlation and significance values, refer to Appendix G.

There is a moderate positive linear correlation between visitors and commerce GDP and transport GDP. The linear correlation between visitors and mining GDP does not necessarily fit the context, and should rather be looked at from the perspective of a shared trend where both series crashed in 2020 after being on a similar growth trend years prior.

The manufacturing sector showed almost no linear correlation with an r value close to zero. This helps confirm that visitor to GDP correlations displayed in Table 7 are not justified by a general upward trend over, but there is indeed a correlation between visitor volume and certain sectoral GDP.

Table 7. Pearson correlations of visitor totals and sectoral GDP in Cusco.

Pair	Pearson correlation (r)	Significance
Visitors & Tourism GDP	0.917	$p < 0.001$
Visitors & Total GDP	0.529	$p = 0.020$
Visitors & Commerce GDP	0.524	$p = 0.021$
Visitors & Transport GDP	0.618	$p = 0.005$
Visitors & Mining GDP	0.492	$p = 0.032$
Visitors & Construction GDP	0.417	$p = 0.075$
Visitors & Agriculture GDP	0.315	$p = 0.189$
Visitors & Manufacturing GDP	-0.009	$p = 0.972$

Similarly, a regression of GDP sectors on visitor volumes helped determine which sectors move with visitor numbers as seen in Table 8. Full calculations in Appendix H.

Table 8. Regression of sectoral GDP on visitors.

Sector (dependent variable)	R^2	B (visitors)	Significance
Tourism	0.841	0.391	$p < 0.001$
Transport	0.382	0.294	$p = 0.005$
Commerce	0.275	0.352	$p = 0.021$
Construction	0.174	0.551	$p = 0.075$
Mining	0.242	2.732	$p = 0.032$
Agriculture	0.099	0.055	$p = 0.189$
Manufacturing	0.000	-0.002	$p = 0.972$

As expected, tourism has the best fit of the model as described by $R^2 = 0.841$ and a high significance level ($p < 0.001$). Alongside tourism, transport and commerce were also two sectors with statistically significant results, which makes sense given that these two sectors complement tourism activities directly. For example, commerce can include retail, food, souvenirs, and handicrafts, while transportation accounts for the train moving visitors from Aguas Calientes to Machu Picchu and other internal routes in the region. Sectors like agriculture and manufacturing showed no link to visitor volumes. The mining sector had the highest coefficient out of all sectors (2.732), but again, this value should be analyzed carefully, since it reflects a shared trend as discussed earlier.

Elasticity:

An elasticity test was conducted to determine what percentage change in visitor numbers is associated with what percentage change in the tourism GDP. The results are shown in Table 9 and the model specification is in Appendix I.

Table 9. Elasticity results from regressing log of GDP on log of visitor numbers.

Variables	R^2	Elasticity	Significance
ln(GDP total) ~ ln(visitors)	0.130	0.180	$p = 0.129$
ln(GDP tourism) ~ ln(visitors)	0.783	0.462	$p < 0.001$

As seen Table 9, a 10% increase in visitor numbers is linked with about a 4.6% increase in tourism GDP. The elasticity value was highly significant at 0.462. However, there is no statistically detectable change in Cusco's total GDP because the elasticity value of 0.180 was not significant. This result suggests a nuanced interpretation: the tourism sector is only one out of the 11 sectors that make up Cusco region's total GDP as per the data publicly available on the INEI website. Visitor numbers matter largely for the tourism sector, proved by their strong positive linear correlation, but the aggregate GDP in the region is shaped by other, arguably larger sectors, such as commerce, transport, and mining. In fact, these sectoral GDP levels move primarily with each other more than they move with tourism.

Conclusion

a) Tourism increased tourism-sector GDP, not aggregate GDP

The correlation between visitors and tourism GDP (see Appendix G) was $r = 0.917$ and an elasticity value of 0.462 ($p < 0.001$). The regression performed on sectoral GDP resulted in tourism having the strongest model fit ($R^2 = 0.841$) and a highly significant coefficient. Despite this strong correlation, there was no evidence that supports the claim that GDP tourism has a large effect on GDP total in Cusco. The elasticity of the provincial economy was 0.180 and was not significant. Moreover, the D-i-D analysis found that there is no significant divergence in total GDP levels that can be attributed to the post 2017 period.

Thus, tourism drives its own and contributes directly to the growth of GDP tourism. Activities in the tourism industry also have small effects on other sectors that complement it, such as transport and commerce. Nonetheless, tourism is not a main driver of Cusco's total GDP as mining is.

A key finding of the study is that tourism-sector growth continued even when visitor growth slowed down. In 2017, visitor growth shrank by 0.58%. Nevertheless, Cusco's GDP attributed to tourism grew this same year by 1.28% while the aggregate GDP of the Cusco region shrank by 1.47%. This decrease in Cusco's GDP aligns with a decrease in the mining output of the region. A slightly lower growth in total tourism in 2017 compared to 2016 did not affect regional tourism GDP. In fact, the tourism sector remained resilient during this short-run negative fluctuation.

b) Restrictions did not slow tourism growth

The July 2017 policy reform, which was intended to distribute visitor flows, did not decrease tourism numbers nor slowed tourism growth. No statistically significant level or slope changes were found at July 2017 (Figure 2).

The counterfactual projection trend showed that actual visitors were only 0.6% less than projected in 2017. In 2018, actual visitors surpassed by 5.6% the projected numbers and in 2019, actual numbers were 1.5% above those projected. The 2017 reform was not meant to cap the visitor numbers, but rather to distribute flows at the site better. Tourism numbers in 2017 were slightly lower than in 2016, but this bare difference does not provide any evidence of tourism slowdown. Tourism grew back again in 2018 and reached a historic peak in 2019 when Machu Picchu received 1,585,262 visitors in the calendar year (MINCETUR, 2020).

Because of this peak, UNESCO urged Peru to strictly respect capacity limits and promote alternative sites outside the main citadel (UNESCO, 2019). Following the growing concerns for tourism growth, the Peruvian government started implementing visitor caps the following years.

DiD results:

While comparing GDP levels in Cusco relative to other provinces can provide a baseline to contextualize Cusco's GDP and tourism data, it is key to acknowledge the model limitations. When Cusco was compared to Arequipa in terms of GDP level, the D-i-D model showed that the GDP of Cusco grew relatively less than that of Arequipa after 2017. The driver of this event was the rapid growth that Arequipa experienced in the mining industry just before 2017. Tourism was not the factor that prompted this difference. Repeating this comparison between Cusco and Puno, no significance was found, so there is no causal evidence of post-policy GDP effects.

The limitations of the D-i-D analysis are linked to geographical and socioeconomic factors of the provinces. Due to Peru's centralization of resources and services in Lima, drawing comparisons across provinces is challenging. Moreover, publicly available data from INEI on GDP and employment included at most a decade pre and post the time of the policy reform in question. There was no province employment data before 2017 posted online. Therefore, this study was limited to detecting large DiD effects, and none were found.

Policy implications for other UNESCO sites:

As the province with the highest relative concentration and regional dependency on tourism, tourism reforms at Machu Picchu matter disproportionately for Cusco, even when GDP data does not show large changes.

While this study did not find concluding evidence showing a relationship between visitor control reforms and visitor number fluctuations in 2017, the literature review and sectoral GDP analysis did reveal broader tourism implications. Looking at the history of Machu Picchu management resolutions and policies, pre-2017, management of the site focused on defining goals, responsibilities, and setting standards and timelines for review. Post-2017, given the growth of the tourism sector between 2018 and 2019, conservation authorities realized the need to establish visitor caps, more routinary reviews, and follow evidence-based restrictions to preserve the biocultural heritage.

If the 2017 reforms were put in place to control or slow down visitor growth, this goal was not accomplished. Tourism growth rose in 2018 by 5.6% relative to the year prior, and the segmented regression found no significant slope change in growth trend at the July 2017 cutoff. What the reform did enhance is visitor flow and distribution within the site, reducing congestion around the citadel. This distinction between tourism caps and tourism redistribution is key to inform tourism management policies at other UNESCO sites. As seen with the July 2017 visitor reforms in Machu Picchu, enhancing the distribution of visitors through strict protocols can improve the visitor experience and contribute to conservation efforts without trading off tourism growth and economic activity.

Appendix

Appendix A. Visitor numbers in Machu Picchu

2012			2013			2014			2015			2016			2017			2018			2019		
National	Foreign	Total	National	Foreign	Total	National	Foreign	Total	National	Foreign	Total	National	Foreign	Total	National	Foreign	Total	National	Foreign	Total	National	Foreign	Total
27388	60342	87730	29144	61600	90744	23891	61878	85769	33356	68057	101413	39109	69652	108761	36992	78711	115703	31837	84898	116735	44196	74382	118578
12877	42000	54877	15356	41556	56912	14749	38485	53234	24443	48533	72976	29596	56236	85832	25479	59561	85040	28071	63051	91122	24673	58008	82681
18225	54003	72228	23532	62578	86110	14616	62231	76847	17048	70048	87096	26556	81928	108484	18670	73100	91770	19095	93276	112371	17149	89687	106836
24135	67211	91346	20468	64929	85397	17296	74005	91301	18363	78489	96852	20195	72931	93126	18765	90879	109644	16822	102112	118934	18596	119482	138078
22325	69378	91703	25951	77167	103118	19081	83047	102128	22320	87432	109752	30431	96398	126829	18877	98759	117636	21643	119363	141006	23270	118692	141962
25099	62275	87374	26942	67473	94415	20657	68815	89472	22921	76040	98961	27051	87529	114580	21332	94914	116246	20778	108128	128906	24266	108312	132578
34267	80931	115198	31955	84452	116407	31385	86246	117631	36781	99848	136629	45679	107363	153042	34318	113817	148135	34377	130567	164944	36555	131500	168055
41027	72930	113957	47118	79980	127098	41646	84648	126294	49527	90450	139977	48460	104298	152758	44054	111229	155283	54923	127338	182261	50323	122868	173191
33439	68670	102109	34020	73927	107947	26353	78906	105259	36301	83619	119920	36797	94052	130849	29070	98484	127554	31758	118044	149802	33087	115758	148845
46071	73025	119096	48121	76345	124466	35397	80554	115951	52057	79216	131273	52167	91218	143385	39445	98022	137467	37507	109374	146881	38994	110793	149787
41461	62392	103853	45216	63875	109091	32399	66647	99046	32369	70183	102552	44826	71026	115852	30364	82918	113282	31448	92562	124010	35873	91157	127030
25651	49312	74963	25137	50466	75603	21516	56729	78245	25976	59138	85114	21876	64133	86009	23229	70290	93519	21406	75698	97104	22659	74982	97641
351965	762469	**1114434**	372960	804348	**1177308**	298986	842191	**1141177**	371462	911053	**1282515**	422743	996764	**1419507**	340595	1070684	**1411279**	349665	1224411	**1574076**	369641	1215621	**1585262**

Appendix B. Segmented regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	post_t, t, post[b]	.	Enter

a. Dependent Variable: total_sum
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin–Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.961[a]	.924	.921	49477.00866	.924	372.123	3	92	<.001	.309

a. Predictors: (Constant), post_t, t, post
b. Dependent Variable: total_sum

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.733E+12	3	9.109E+11	372.123	<.001[b]
	Residual	2.252E+11	92	2447974386		
	Total	2.958E+12	95			

a. Dependent Variable: total_sum
b. Predictors: (Constant), post_t, t, post

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	371009.730	49448.770		7.503	<.001	272800.204	469219.256
	t	5685.552	319.689	.898	17.785	<.001	5050.621	6320.482
	post	15787.228	216219.110	.042	.073	.942	-413642.587	445217.044
	post_t	67.272	1091.513	.036	.062	.951	-2100.566	2235.111

a. Dependent Variable: total_sum

Coefficient Correlations[a]

Model			post_t	t	post
1	Correlations	post_t	1.000	-.293	-.996
		t	-.293	1.000	.227
		post	-.996	.227	1.000
	Covariances	post_t	1191400.043	-102201.206	-235161451
		t	-102201.206	102201.206	15687885.1
		post	-235161451	15687885.1	4.675E+10

a. Dependent Variable: total_sum

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1058961.50	1629407.00	1338194.75	169607.730	96
Residual	-116778.789	87639.03906	.00000	48689.52589	96
Std. Predicted Value	-1.646	1.717	.000	1.000	96
Std. Residual	-2.360	1.771	.000	.984	96

a. Dependent Variable: total_sum

Univariate Analysis of Variance

Between-Subjects Factors

		N
month	1	8
	2	8
	3	8
	4	8
	5	8
	6	8
	7	8
	8	8
	9	8
	10	8
	11	8
	12	8

Tests of Between-Subjects Effects

Dependent Variable: total_sum

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.777E+12[a]	14	1.984E+11	88.749	<.001
Intercept	1.305E+11	1	1.305E+11	58.398	<.001
month	4.417E+10	11	4015893900	1.797	.068
t	7.826E+11	1	7.826E+11	350.152	<.001
post	15084697.3	1	15084697.3	.007	.935
post_t	124287354	1	124287354	.056	.814
Error	1.810E+11	81	2235047044		
Total	1.749E+14	96			
Corrected Total	2.958E+12	95			

a. R Squared = .939 (Adjusted R Squared = .928)

Segmented regression where “month” is main effect

Univariate Analysis of Variance

Between-Subjects Factors

		N
month	1	8
	2	8
	3	8
	4	8
	5	8
	6	8
	7	8
	8	8
	9	8
	10	8
	11	8
	12	8

Tests of Between-Subjects Effects

Dependent Variable: total_sum

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.777E+12[a]	14	1.984E+11	88.749	<.001
Intercept	1.305E+11	1	1.305E+11	58.398	<.001
t	7.826E+11	1	7.826E+11	350.152	<.001
post	15084697.3	1	15084697.3	.007	.935
post_t	124287354	1	124287354	.056	.814
month	4.417E+10	11	4015893900	1.797	.068
Error	1.810E+11	81	2235047044		
Total	1.749E+14	96			
Corrected Total	2.958E+12	95			

a. R Squared = .939 (Adjusted R Squared = .928)

Parameter Estimates

Dependent Variable: total_sum

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Intercept	328293.230	50525.755	6.498	<.001	227762.827	428823.633
t	5732.229	306.334	18.712	<.001	5122.720	6341.738
post	-17048.417	207519.590	-.082	.935	-429947.307	395850.473
post_t	246.887	1046.955	.236	.814	-1836.225	2329.999
[month=1]	67527.692	23750.393	2.843	.006	20271.860	114783.525
[month=2]	61733.742	23725.870	2.602	.011	14526.702	108940.781
[month=3]	55939.791	23706.244	2.360	.021	8771.802	103107.780
[month=4]	50145.840	23691.527	2.117	.037	3007.134	97284.547
[month=5]	44351.890	23681.728	1.873	.065	-2767.320	91471.100
[month=6]	38557.939	23676.853	1.629	.107	-8551.572	85667.450
[month=7]	29124.057	23732.860	1.227	.223	-18096.889	76345.004
[month=8]	23299.246	23698.805	.983	.328	-23853.942	70452.434
[month=9]	17474.434	23672.284	.738	.463	-29625.985	64574.854
[month=10]	11649.623	23653.322	.493	.624	-35413.069	58712.315
[month=11]	5824.811	23641.938	.246	.806	-41215.229	52864.852
[month=12]	0[a]	.	.	.	.	.

a. This parameter is set to zero because it is redundant.

Appendix C. Robustness check across regions

Robustness Cusco and Arequipa

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	did, treatment, post2017[b]	.	Enter

a. Dependent Variable: gdp_total

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin–Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.872[a]	.761	.740	2916906.72	.761	36.034	3	34	<.001	.803

a. Predictors: (Constant), did, treatment, post2017

b. Dependent Variable: gdp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.198E+14	3	3.066E+14	36.034	<.001[b]
	Residual	2.893E+14	34	8.508E+12		
	Total	1.209E+15	37			

a. Dependent Variable: gdp_total

b. Predictors: (Constant), did, treatment, post2017

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	21669132.0	922406.897		23.492	<.001	19794575.6	23543688.4
	treatment	−4557843.00	1304480.344	−.404	−3.494	.001	−7208866.02	−1906819.98
	post2017	9097651.444	1340226.149	.805	6.788	<.001	6373984.211	11821318.7
	did	−4639884.11	1895365.997	−.350	−2.448	.020	−8491731.25	−788036.970

a. Dependent Variable: gdp_total

Coefficient Correlations[a]

Model			did	treatment	post2017
1	Correlations	did	1.000	−.688	−.707
		treatment	−.688	1.000	.487
		post2017	−.707	.487	1.000
	Covariances	did	3.592E+12	−1.702E+12	−1.796E+12
		treatment	−1.702E+12	1.702E+12	8.508E+11
		post2017	−1.796E+12	8.508E+11	1.796E+12

a. Dependent Variable: gdp_total

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	17111288.0	30766784.0	22600704.4	4985810.64	38
Residual	−6197564.00	7953980.00	.0000	2796154.33	38
Std. Predicted Value	−1.101	1.638	.000	1.000	38
Std. Residual	−2.125	2.727	.000	.959	38

a. Dependent Variable: gdp_total

Robustness Cusco and Puno

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	did, treatment, post2017[b]	.	Enter

a. Dependent Variable: gdp_total

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.935[a]	.875	.863	2241085.09	.875	79.012	3	34	<.001	.412

a. Predictors: (Constant), did, treatment, post2017

b. Dependent Variable: gdp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.190E+15	3	3.968E+14	79.012	<.001[b]
	Residual	1.708E+14	34	5.022E+12		
	Total	1.361E+15	37			

a. Dependent Variable: gdp_total

b. Predictors: (Constant), did, treatment, post2017

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	7528157.800	708693.332		10.623	<.001	6087919.668	8968395.932
	treatment	9583131.200	1002243.721	.801	9.562	<.001	7546326.900	11619935.5
	post2017	2261602.089	1029707.538	.189	2.196	.035	168984.598	4354219.580
	did	2196165.244	1456226.366	.156	1.508	.141	-763242.792	5155573.281

a. Dependent Variable: gdp_total

Coefficient Correlations[a]

Model			did	treatment	post2017
1	Correlations	did	1.000	-.688	-.707
		treatment	-.688	1.000	.487
		post2017	-.707	.487	1.000
	Covariances	did	2.121E+12	-1.004E+12	-1.060E+12
		treatment	-1.004E+12	1.004E+12	5.022E+11
		post2017	-1.060E+12	5.022E+11	1.060E+12

a. Dependent Variable: gdp_total

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	7528158.000	21569056.0	13911153.0	5672358.92	38
Residual	-6197564.00	4786981.00	.0000	2148309.96	38
Std. Predicted Value	-1.125	1.350	.000	1.000	38
Std. Residual	-2.765	2.136	.000	.959	38

a. Dependent Variable: gdp_total

Appendix D. Robustness check across pre and post-COVID periods

Robustness Year <2007 and 2019<

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	did, treatment, post2017[b]	.	Enter

a. Dependent Variable: gdp_total

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.336[a]	.113	.037	7493481.89	.113	1.484	3	35	.236	.201

a. Predictors: (Constant), did, treatment, post2017

b. Dependent Variable: gdp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.500E+14	3	8.335E+13	1.484	.236[b]
	Residual	1.965E+15	35	5.615E+13		
	Total	2.215E+15	38			

a. Dependent Variable: gdp_total

b. Predictors: (Constant), did, treatment, post2017

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	14598644.9	1675593.490		8.713	<.001	11197009.3	18000280.5
	treatment	2512644.100	2902213.057	.157	.866	.393	-3379161.64	8404449.837
	post2017	5824934.100	3488025.997	.326	1.670	.104	-1256135.13	12906003.3
	did	-1174779.10	6041438.244	-.042	-.194	.847	-13439550.8	11089992.6

a. Dependent Variable: gdp_total

Coefficient Correlations[a]

Model			did	treatment	post2017
1	Correlations	did	1.000	-.480	-.577
		treatment	-.480	1.000	.277
		post2017	-.577	.277	1.000
	Covariances	did	3.650E+13	-8.423E+12	-1.217E+13
		treatment	-8.423E+12	8.423E+12	2.808E+12
		post2017	-1.217E+13	2.808E+12	1.217E+13

a. Dependent Variable: gdp_total

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	14598645.0	21761444.0	16690040.9	2565184.27	39
Residual	-10988842.0	15024467.0	.0000	7191606.00	39
Std. Predicted Value	-.815	1.977	.000	1.000	39
Std. Residual	-1.466	2.005	.000	.960	39

a. Dependent Variable: gdp_total

Robustness Year <2021 and 2024<

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	20524061.4	3364452.664		6.100	<.001	13027593.7	28020529.1
	did	1315241.625	5827402.954	.071	.226	.826	-11669021.3	14299504.6

a. Dependent Variable: gdp_total

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	treatment	.[b]	.	.	.	.000

a. Dependent Variable: gdp_total

b. Predictors in the Model: (Constant), did

Coefficient Correlations[a]

Model			did
1	Correlations	did	1.000
	Covariances	did	3.396E+13

a. Dependent Variable: gdp_total

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	20524062.0	21839304.0	20962475.3	647580.2105	12
Residual	-11181693.0	11112115.0	.0000	9073254.09	12
Std. Predicted Value	-.677	1.354	.000	1.000	12
Std. Residual	-1.175	1.168	.000	.953	12

a. Dependent Variable: gdp_total

Appendix E. Counterfactual trend line

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	year[b]	.	Enter

a. Dependent Variable: mp_total

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.917[a]	.841	.821	99494.236	.841	42.256	1	8	<.001	1.443

a. Predictors: (Constant), year

b. Dependent Variable: mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.183E+11	1	4.183E+11	42.256	<.001[b]
	Residual	7.919E+10	8	9899102904		
	Total	4.975E+11	9			

a. Dependent Variable: mp_total

b. Predictors: (Constant), year

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-142203010	22033902.6		-6.454	<.001	-193013280	-91392739.2
	year	71206.073	10953.955	.917	6.500	<.001	45946.208	96465.938

a. Dependent Variable: mp_total

Coefficient Correlations[a]

Model			year
1	Correlations	year	1.000
	Covariances	year	119989126

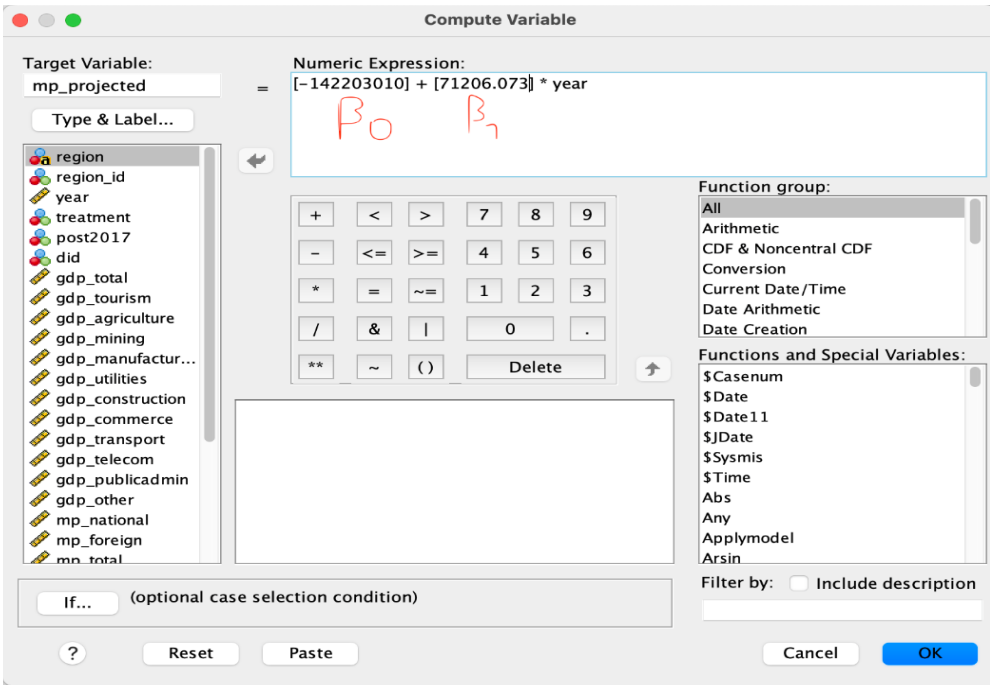
a. Dependent Variable: mp_total

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	707578.25	1348432.88	1028005.60	215587.091	10
Residual	-221365.484	92579.727	.000	93804.065	10
Std. Predicted Value	-1.486	1.486	.000	1.000	10
Std. Residual	-2.225	.931	.000	.943	10

a. Dependent Variable: mp_total

Regression projected coefficient Bo and B1



Appendix F. Mean comparison informality_unemployment_pea

Means

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
unemployment_rate * region	12	15.8%	64	84.2%	76	100.0%
informality_rate * region	9	11.8%	67	88.2%	76	100.0%
pea_thousands * region	9	11.8%	67	88.2%	76	100.0%

Report

region		unemployment_rate	informality_rate	pea_thousands
Arequipa	Mean	6.29620074	64.2663050	785.292639
	N	3	3	3
	Std. Deviation	.726719666	2.44340606	10.4794884
Cusco	Mean	3.89107843	80.0895748	808.143994
	N	3	3	3
	Std. Deviation	.992343153	.973633991	9.03436142
Peru_National	Mean	5.20422491		
	N	3		
	Std. Deviation	.478284817		
Puno	Mean	3.93121711	88.7942640	716.374092
	N	3	3	3
	Std. Deviation	.704107031	.965679475	27.1281491
Total	Mean	4.83068030	77.7167146	769.936908
	N	12	9	9
	Std. Deviation	1.22148543	10.8597290	44.0857362

Appendix G. Correlation matrix: visitors & sectoral GDP

Correlations

		mp_total	mp_national	mp_foreign	gdp_total	gdp_tourism	gdp_agriculture	gdp_construction	gdp_commerce	gdp_transport	gdp_manufacturing	gdp_mining
mp_total	Pearson Correlation	1	.819**	.991**	.529*	.917**	.315	.417	.524*	.618**	-.009	.492*
	Sig. (2-tailed)		<.001	<.001	.020	<.001	.189	.075	.021	.005	.972	.032
	N	19	19	19	19	19	19	19	19	19	19	19
mp_national	Pearson Correlation	.819**	1	.736**	.553*	.842**	.366	.491*	.536*	.564*	.069	.539*
	Sig. (2-tailed)	<.001		<.001	.014	<.001	.123	.033	.018	.012	.780	.017
	N	19	19	19	19	19	19	19	19	19	19	19
mp_foreign	Pearson Correlation	.991**	.736**	1	.497*	.888**	.287	.379	.495*	.600**	-.026	.457*
	Sig. (2-tailed)	<.001	<.001		.030	<.001	.233	.109	.031	.007	.916	.049
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_total	Pearson Correlation	.529*	.553*	.497*	1	.728**	.598**	.817**	.964**	.952**	-.014	.936**
	Sig. (2-tailed)	.020	.014	.030		<.001	.007	<.001	<.001	<.001	.954	<.001
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_tourism	Pearson Correlation	.917**	.842**	.888**	.728**	1	.318	.515*	.681**	.743**	-.163	.736**
	Sig. (2-tailed)	<.001	<.001	<.001	<.001		.184	.024	.001	<.001	.504	<.001
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_agriculture	Pearson Correlation	.315	.366	.287	.598**	.318	1	.788**	.642**	.615**	.542*	.409
	Sig. (2-tailed)	.189	.123	.233	.007	.184		<.001	.003	.005	.017	.082
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_construction	Pearson Correlation	.417	.491*	.379	.817**	.515*	.788**	1	.865**	.819**	.442	.624**
	Sig. (2-tailed)	.075	.033	.109	<.001	.024	<.001		<.001	<.001	.058	.004
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_commerce	Pearson Correlation	.524*	.536*	.495*	.964**	.681**	.642**	.865**	1	.987**	.171	.815**
	Sig. (2-tailed)	.021	.018	.031	<.001	.001	.003	<.001		<.001	.484	<.001
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_transport	Pearson Correlation	.618**	.564*	.600**	.952**	.743**	.615**	.819**	.987**	1	.145	.806**
	Sig. (2-tailed)	.005	.012	.007	<.001	<.001	.005	<.001	<.001		.554	<.001
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_manufacturing	Pearson Correlation	-.009	.069	-.026	-.014	-.163	.542*	.442	.171	.145	1	-.311
	Sig. (2-tailed)	.972	.780	.916	.954	.504	.017	.058	.484	.554		.194
	N	19	19	19	19	19	19	19	19	19	19	19
gdp_mining	Pearson Correlation	.492*	.539*	.457*	.936**	.736**	.409	.624**	.815**	.806**	-.311	1
	Sig. (2-tailed)	.032	.017	.049	<.001	<.001	.082	.004	<.001	<.001	.194	
	N	19	19	19	19	19	19	19	19	19	19	19

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlations

Highly Positive: *(mp_total <---> mp_foreign), (mp_total <---> gdp_tourism), (gdp_total <---> gdp_commerce), (gdp_total <---> gdp_transport), (gdp_total <---> gdp_mining), (gdp_commerce <---> gdp_transport)*

Positive: *(mp_total <---> mp_national), (mp_total <---> gdp_total), (mp_total <---> gdp_agriculture), (mp_total <---> gdp_construction), (mp_total <---> gdp_commerce), (mp_total <---> gdp_transport), (mp_total <---> gdp_mining), (mp_national <---> mp_foreign), (mp_national <---> gdp_total), (mp_national <---> gdp_tourism), (mp_national <---> gdp_agriculture), (mp_national <---> gdp_construction), (mp_national <---> gdp_commerce), (mp_national <---> gdp_transport), (mp_national <---> gdp_manufacturing), (mp_national <---> gdp_mining), (mp_foreign <---> gdp_total), (mp_foreign <---> gdp_tourism), (mp_foreign <---> gdp_agriculture), (mp_foreign <---> gdp_construction), (mp_foreign <---> gdp_commerce), (mp_foreign <---> gdp_transport), (mp_foreign <---> gdp_mining), (gdp_total <---> gdp_tourism), (gdp_total <---> gdp_agriculture), (gdp_total <---> gdp_construction), (gdp_tourism <---> gdp_agriculture), (gdp_tourism <---> gdp_construction), (gdp_tourism <---> gdp_commerce), (gdp_tourism <---> gdp_transport), (gdp_tourism <---> gdp_mining), (gdp_agriculture <---> gdp_construction), (gdp_agriculture <---> gdp_commerce), (gdp_agriculture <---> gdp_transport), (gdp_agriculture <---> gdp_manufacturing), (gdp_agriculture <---> gdp_mining), (gdp_construction <---> gdp_commerce), (gdp_construction <---> gdp_transport), (gdp_construction <---> gdp_manufacturing), (gdp_construction <---> gdp_mining), (gdp_commerce <---> gdp_manufacturing), (gdp_commerce <---> gdp_mining), (gdp_transport <---> gdp_manufacturing), (gdp_transport <---> gdp_mining)*

No Linear Correlation: *(None)*

Negative: *(mp_total <---> gdp_manufacturing), (mp_foreign <---> gdp_manufacturing), (gdp_total <---> gdp_manufacturing), (gdp_tourism <---> gdp_manufacturing), (gdp_manufacturing <---> gdp_mining)*

Highly Negative: *(None)*

Note: Curated Help is calculated based on actual cell values, not the formatted values.

Appendix H. GDP sectoral regression

gdp_agriculture

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.315[a]	.099	.046	64638.657

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7826868583	1	7826868583	1.873	.189[b]
	Residual	7.103E+10	17	4178156012		
	Total	7.886E+10	18			

a. Dependent Variable: gdp_agriculture

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	988406.296	46077.164		21.451	<.001
	mp_total	.055	.040	.315	1.369	.189

a. Dependent Variable: gdp_agriculture

gdp_commerce

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524[a]	.275	.232	223267.683

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.207E+11	1	3.207E+11	6.434	.021[b]
	Residual	8.474E+11	17	4.985E+10		
	Total	1.168E+12	18			

a. Dependent Variable: gdp_commerce

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1045054.590	159154.631		6.566	<.001
	mp_total	.352	.139	.524	2.537	.021

a. Dependent Variable: gdp_commerce

gdp_construction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.417[a]	.174	.126	468122.782

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.862E+11	1	7.862E+11	3.587	.075[b]
	Residual	3.725E+12	17	2.191E+11		
	Total	4.512E+12	18			

a. Dependent Variable: gdp_construction

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1044714.577	333697.685		3.131	.006
	mp_total	.551	.291	.417	1.894	.075

a. Dependent Variable: gdp_construction

gdp_manufacturing

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.009[a]	.000	-.059	109061.4552

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15334965.3	1	15334965.3	.001	.972[b]
	Residual	2.022E+11	17	1.189E+10		
	Total	2.022E+11	18			

a. Dependent Variable: gdp_manufacturing

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1242902.966	77743.610		15.987	<.001
	mp_total	-.002	.068	-.009	-.036	.972

a. Dependent Variable: gdp_manufacturing

Gdp_mining

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.492[a]	.242	.198	1885242.596

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.931E+13	1	1.931E+13	5.434	.032[b]
	Residual	6.042E+13	17	3.554E+12		
	Total	7.973E+13	18			

a. Dependent Variable: gdp_mining

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5385775.832	1343880.525		4.008	<.001
	mp_total	2.732	1.172	.492	2.331	.032

a. Dependent Variable: gdp_mining

Gdp_tourism

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.917[a]	.841	.832	66363.044

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.962E+11	1	3.962E+11	89.955	<.001[b]
	Residual	7.487E+10	17	4404053673		
	Total	4.710E+11	18			

a. Dependent Variable: gdp_tourism

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	306023.364	47306.380		6.469	<.001
	mp_total	.391	.041	.917	9.484	<.001

a. Dependent Variable: gdp_tourism

gdp_transport

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.618[a]	.382	.346	145972.686

a. Predictors: (Constant), mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.242E+11	1	2.242E+11	10.521	.005[b]
	Residual	3.622E+11	17	2.131E+10		
	Total	5.864E+11	18			

a. Dependent Variable: gdp_transport

b. Predictors: (Constant), mp_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	480948.046	104055.494		4.622	<.001
	mp_total	.294	.091	.618	3.244	.005

a. Dependent Variable: gdp_transport

Appendix I. Elasticity w ln_gdp as dependent and ln_visitors as independent

Regression

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ln_visitors[b]	.	Enter

a. Dependent Variable: ln_gdp

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.361[a]	.130	.079	.21684

a. Predictors: (Constant), ln_visitors

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.120	1	.120	2.551	.129[b]
	Residual	.799	17	.047		
	Total	.919	18			

a. Dependent Variable: ln_gdp

b. Predictors: (Constant), ln_visitors

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	14.261	1.559		9.148	<.001
	ln_visitors	.180	.113	.361	1.597	.129

a. Dependent Variable: ln_gdp

Elasticity w ln_gdp_tourism as dependent & ln_visitor as independent

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	ln_visitors[b]	.	Enter

a. Dependent Variable: ln_gdp_tourism
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.885[a]	.783	.770	.11352

a. Predictors: (Constant), ln_visitors

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.789	1	.789	61.262	<.001[b]
	Residual	.219	17	.013		
	Total	1.009	18			

a. Dependent Variable: ln_gdp_tourism
b. Predictors: (Constant), ln_visitors

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	7.092	.816		8.690	<.001
	ln_visitors	.462	.059	.885	7.827	<.001

a. Dependent Variable: ln_gdp_tourism

Multiple regression w gdp_tourism as dependent and year&mp_total as independent

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.928[a]	.862	.845	63722.270

a. Predictors: (Constant), year, mp_total

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.061E+11	2	2.030E+11	50.002	<.001[b]
	Residual	6.497E+10	16	4060527700		
	Total	4.710E+11	18			

a. Dependent Variable: gdp_tourism
b. Predictors: (Constant), year, mp_total

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-8456113.04	5611611.385		-1.507	.151
	mp_total	.372	.041	.873	8.995	<.001
	year	4356.437	2789.940	.152	1.561	.138

a. Dependent Variable: gdp_tourism

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