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Tourism seasonality management strategies – what can we learn from payment data

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Abstract

Purpose

A convenient payment system is increasingly recognized as an asset of tourism destinations. By using data on payments with cards issued in foreign countries, together with other monthly tourism flow variables, we assess the importance of card payments to identify seasonality in inbound tourism in Portugal.

Design/methodology/approach

We compute seasonality measures using Portuguese data on card payments from 2003 to 2019, together with data on nights spent and the Balance of Payments travel credit. We also assess seasonal behaviour in the timespan of the different tourism strategic plans in place during this period.

Findings

Card payments grew at a faster pace than the other inbound tourism variables and show a seasonal pattern similar to the other variables. Seasonality decreased when variables measured in quantities are considered (nights spent and number of card transactions). However, when we use value variables (Balance of Payments travel credit and value of card transactions), seasonality in 2019 is higher than in 2003.

Implications

The widespread use of digital payments makes card payment information an even better proxy of tourism activity, and since it is available in a short time-span it has informational potential for tourism stakeholders and for researchers in this field.

Originality

We study the seasonal behaviour of foreign card payments along with other international tourism flow variables. Our results highlight the informational potential of card payment data and the importance of electronic payment infrastructure for tourist activity.

Introduction

Seasonality is a regular pattern of most tourism flows even if some tourist destinations are more impacted by this phenomenon than others (Duro and Turrión-Pratts, 2019). Climate and weather, work organization and the school calendar with fixed holiday periods are among the numerous factors that influence tourism seasons. Such fluctuations have a profound economic impact, ranging from an overcrowding of destinations, attractions and infrastructures in the high season to underutilized facilities and unemployment in the low season. Therefore, in mature tourism destinations both public and private sectors have put considerable effort into reducing seasonality (Koenig-Lewis and Bischoff, 2010). Medium and long-term development and consolidation strategies do include reduction in seasonality as one of their main policy goals.

Seasonality measurement is still central to tourism research and different research strategies have been followed to enhance the knowledge of seasonal behaviour (Ferrante *et al.*, 2018). In our work we use information on payments with cards issued in foreign countries to gain insight into the evolution of foreign tourism seasonality in Portugal, along with the strategies designed to tackle it. We innovate by using this information - card payments in quantity and value - which, to our knowledge, was never used before to measure foreign tourism seasonality. We claim that it is relevant from a tourism management perspective due to the growing use of cashless payments and to the fast disclosure of this data. As payment cards (and other new forms of payment, such as digital currencies) are expected to be increasingly used in the future, as a result of the pandemic and the projected launch of central bank digital currencies - CBDC (Turkay *et al.*, 2019), this information will be increasingly relevant.

The relevance of the Portuguese context in particular is twofold. First, the importance of tourism activities for the Portuguese economy grew strongly in the last decade. According to Eurostat (2021), the share of accommodation and food services in Gross Value Added in 2019 in Portugal (7.54%) was higher than that of the Europe Union-27 (EU) (3.54%). Between 2011 and 2019 the number of enterprises more than doubled in annual EU rate (4.1% and 1.3%, respectively). In this period, the average annual growth rate of international tourist arrivals to accommodation establishments in Portugal was 10.5%, which compares with 5.1% in the EU. In 2019 foreign tourists totalled 16,3 million, accounting for 70% of the nights spent in tourist accommodation (INE, 2020). In a country where the Sun & Sea segment is still predominant,

the growing importance of tourism also led to concerns about seasonality, given its negative impact on sustainability. In advanced economies, tourism seasonality increases in line with growth, as Duro and Turrión-Pratts (2019) found for the period 2008-2013, especially in the Mediterranean region and Southern Europe. In their study Portugal is classified as a country with a problematic situation of high demand growth and increase in monthly concentration. This fact is acknowledged in the Portuguese tourism strategic policy that, in the last two decades, has included several measures to counter seasonality.

Second, in Portugal, the payments rely strongly on the use of cards, due to the single and shared network of Automated Teller Machines (ATM) and Points-of Sale (POS) developed by the Portuguese banks in the 1980s (SIBS, 2008; Evans and Abrantes-Metz, 2014).

To achieve our goal, we use several time series of tourist flows to Portugal between 2003 and 2019: the series of nights spent by foreign tourists, the series of travel credits on the Balance of Payments and, finally, the series of payments (in quantity and in value) made in Portugal with cards issued in foreign countries. Our approach represents a step forward since card payments are monthly series, available with just one-month lag, while, for instance, the travel balance account is disclosed with a two-month lag. The advantage thereof is highlighted by Esteves (2009), who used monthly POS and ATM data to forecast private consumption in Portugal.

Using this rich dataset, we compute and compare several measures of seasonality to delve deeper into this phenomenon and to check the results of the different tourism strategic plans adopted in this period. First, we find evidence of a growing importance of card payments in Portugal in the period studied, as expected. Second, we conclude that foreign card payment variables follow a similar pattern of seasonality along with traditional data on nights spent by foreign tourists. Third, we note that seasonality of real variables decreased in the period considered. The same conclusion does not emerge from the monetary variables (Bp-travel credit and Cards-value of transactions). Therefore, we contribute to the view that the study of quantity and payment variables helps to broaden knowledge about inbound tourism. Our approach also provides for a deeper analysis of tourist expenditure, since card payments provide an effective direct measure of tourist transactions. Considering that payment data can enable a timely and improved understanding of economic forces (Krenzlin et al., 2020), we highlight this source of information as useful to quickly inform policymakers about the behaviour of tourism demand, either in terms of volume and expenditure.

This article is initiated by both a literature review and a presentation of the variables and the methodology. Latter we will analyse and discuss the results, ending with some general conclusions and identification of the limitations and future opportunities for further research.

Literature Review

The seasonality phenomenon that characterizes tourism demand and tourism activities has complex causes (Koenig-Lewis and Bischoff, 2005; Nadal *et al.*, 2004) and raises a series of problems for economies and societies. Seasonality produces various types of complex effects and impacts on the economy (e.g. underutilization of resources and the consequent loss of profit, disruption of employment), environmental sustainability (e.g. overcrowding, pressure and damage to the natural environment) and socio-cultural framework (e.g. disruption of traffic, parking and services) during the peak periods and in the low season (Koenig-Lewis and Bischoff, 2005; Martín *et al.*, 2014; Martín *et al.*, 2019; Xie, 2020). Some advantages of seasonality are recognized, such as time for maintenance and repair, the possibility to take seasonal jobs and to promote ecological and social recovery (Koenig-Lewis and Bischoff, 2005; Fernández-Morales *et al.*, 2016; Duro and Turrión-Pratts, 2019).

One of the factors that can help to reduce seasonality is tourist income. People with higher income tend to spread out their holidays over the year, thus contributing to reduce seasonality (Koening-Lewis and Bishoff, 2005; Nadal *et al.*, 2004). Turrión–Pratts and Duro (2018) analyse tourism demand in Spain and find evidence that income of the source markets is a factor that contributes positively to the (annual) demand of tourism and to reduce monthly concentration. Xie (2020) drew similar conclusions for Norway, since the rise in income of Chinese and Japanese tourists contributes to reduce the seasonal pattern. Additionally, different markets of origin may show different seasonality patterns, so detecting which markets have less seasonal behaviour allows for targeting efforts at attracting compatible segments (Turrión–Pratts and Duro, 2018; Fernández-Morales and Mayorga-Toledano, 2008).

Also, the demand for certain tourism products has been identified in the literature as having potential to mitigate the effects of seasonality, such as cultural tourism (Vergori and Arima, 2020; Cisneros-Martínez and Fernández-Morales, 2015), cruise tourism (Fernández-Morales and Cisneros-Martínez, 2019), event tourism, whether sports, business or festivals (Connel *et al*., 2015; Getz and Page, 2016), wellness tourism (Marton *et al*., 2019), golf tourism (García and del Mar, 2021) or social tourism (Cisneros-Martínez *et al.,* 2018). Even the type of accommodation, peer-to-peer compared to traditional hotels, is less subject to seasonality

(Benítez-Aurioles, 2022). Since seasonality not only alters tourism demand, but also affects the composition and the characteristics of incoming tourists and related behaviour, seasonality mitigation policies should include not only product and market diversification, but also the development of an effective marketing strategy that promotes different features of tourist destinations (Choe *et al.*, 2019).

The study and measurement of seasonality remain central to tourism research. The literature proposes a whole range of measures and indicators to characterize the pattern and amplitude of seasonality, each one of them with their advantages and weakness (Magno *et al.*, 2017; Almeida, 2015; Rosselló and Sansó, 2017). The seasonal indices characterize the seasonality pattern. To measure the amplitude of the seasonal effect, researchers calculate the annual coefficient of variation of the series, the seasonality ratio, the weight of the most important months in the year's total, the GINI and the Theil coefficients, among other measures.

Recent papers search for an approach capable of overcoming the dependency of indicators based on individual variables, which only provide a partial outlook on the phenomenon. Martín *et al.* (2019) use the Distance Method (DP2) to aggregate a set of partial indicators in order to calculate a synthetic indicator that offers a better picture of tourism seasonality, because it includes, simultaneously, supply and demand variables in its construction and allows a comprehensive comparison between regions/countries. From another perspective, the transportation cost approach adopted by Magno *et al.* (2017) considers the cyclical ordering of the months. The measurement of seasonality is explicitly related with the distance between the seasonal peaks. Ferrante *et al.* (2018) applied this methodology to analyse and compare seasonality patterns in European countries.

The theoretical link between tourist arrivals and tourist expenditure in the context of tourism demand modelling is explored by Rosselló-Nadal and He (2020). They confirm that estimated elasticities may differ since tourism determinants can affect tourist expenditure and flows to differing extents. Duro (2018) breaks seasonal tourism revenues down into several factors: the number of tourists, the average length of their stay and the daily average revenues, while Lozano *et al.* (2021) explore the relationship between hotel price flexibility and the seasonality of night stays. Also, the identification and evaluation of new types of data available to produce tourism statistics is important due the increasing mobility of tourists (Saluveer *et al.* 2020)[1].

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[1] A recent approach in the tourism literature is the use of big data and the combination of different data sets (traditional data and big data) to evaluate tourism performance (Saluveer *et al.* 2020; Batista e Silva *et al.* 2018). One type of big data is transaction data, in which we can include consumer card data that allows the study of tourist purchases (Li *et al.*, 2018; McElroy *et al.*, 2018). The data we use cannot be considered big data since it is

Thus, the consideration of different information sources and seasonality measures provides for a better understanding of seasonality.

Tourists pay for the services they purchase using several payment methods. The choice of the payment method and its potential for the development of tourism are relevant areas of research. Tourism expenditure and its balance of payments benefitted from the card system expansion, as was the case of Turkey (Gul, 2014) or is likely to happen in India after demonetization (Passah and Kumar, 2019). Tourists with a high level of destination mobile payment (m-payment) knowledge are likely to find m-payment systems in the destination more attractive (easier to use and safer) than tourists lacking such knowledge (Peng *et al.*, 2012). When booking tourist accommodation, cash and debit cards are widely accepted and the easiest to use. Card payments are considered safe, specially by younger tourists, individuals who travel more and individuals who spend large amounts on accommodation (Almeida *et al*., 2019).

Moreover, research on card payments highlights significant heterogeneity in the use of payment instruments by household characteristics. Japanese households with higher disposable income tend to use cards more intensively, as is also the case of younger, financially literate households and female heads of households (Fujki and Tanaka, 2018). In China, young and affluent students rank highly the value of holding a credit card, especially when travelling overseas, where there is widespread acceptance of these cards (Worthington *et al*., 2011). Brown *et al.* (2020) find evidence among Swiss consumers that the impact of contactless cards on payment choice is driven by young and urban consumers, who benefit from a dense network of cashless payments. In Canada, older, less-educated and low-income individuals use cash more intensively (Chen *et al.*, 2021).

In sum, the use of a convenient payment system in the tourism sector is a concern of researchers, intensified and extended to all economic sectors in the context of the Covid-19 pandemic crisis. Kraenzlin *et al*. (2020) report shifts in regional retail payments in Switzerland during the Covid-19 pandemic that are justified by the absence of foreign tourists and business travelers, among other reasons. They use data on payments with foreign cards and find evidence that, in tourist hotspots, these shifts are exacerbated[2]. The fear of transmission of the disease through coins and bank notes, as well as the growing importance of e-commerce, called

the monthly aggregate of all transactions with cards. However, it shows the usefulness of card data that can be even more insightful if more detailed.

[2] Ho *et al.* (2022), using individual -level data find evidence of a decrease in credit usage during the COVID-19 pandemic in Canada, related to limited spending opportunities. Nonetheless, Chen *et al.* (2021) report an increase in the share of credit card purchases and in the volume share of debit cards in a period that includes the first year of the COVID-19 pandemics.

for easy and secure contactless and remote payments (e.g. Cevik, 2020; Kraenzlin *et al.*, 2020; Barabas and Schmidt, 2021; Khanra *et al.* 2021). Also, the cashless payment system can enhance the tourist experience and provide a competitive advantage to market destinations (Wulandari 2017; Ozturk 2016; Miniaoui *et al.*, 2019). In the future, also due to the expected launch of CBDC (Turkay *et al.*, 2019), digital payment infrastructure will be a fundamental asset for tourism.

Materials and Methods

We compute conventional measures of seasonality to obtain a robust picture of seasonality in foreign tourism demand in Portugal. Due to the deep pandemic disruption, the period in analysis ends in December 2019. We analyse 3 sets of monthly information on foreign tourism demand and presence in Portugal. One is the series of nights spent at tourist accommodation establishments by residents in foreign countries, available from Eurostat and covering the period since January 1990. Another set of information is the series of balance of payments that records travel credits for Portugal (millions of Euros). This is available from the online statistics of the Portuguese Central Bank (Banco de Portugal) and covers the period from January 1996 onwards. Finally, we also consider two series of payments with cards issued in foreign countries. These series are available from the online statistics of the Portuguese Central Bank and covers the period from September 2000 onwards. This information concerns SICOI, the Portuguese retail payment system, and includes a series on the number of purchases (thousands of operations) and another on the value of purchases (millions of Euros) at POS made with cards issued abroad. In Portugal the payments rely strongly on the use of cards, due to the ATM and POS single shared network developed by the Portuguese banks in the 1980s (SIBS, 2008; Evans and Abrantes-Metz, 2014).

The variable of nights spent at tourist accommodation is clearly related with travel and tourism demand, although limited (in the summer peaks) by available accommodation capacity. The series on travel credits is registered under Travel in the Balance of Goods and Services and concerns "goods and services for own use or to give away acquired from an economy by non-residents during visits to that economy" (IMF, 2009, p. 166). It includes business and personal travel, but excludes international transport. Finally, the variables on payments with foreign cards, combined with the previous ones, provides a broader picture of the seasonal pattern of inbound tourism and how it turns out in revenue. The information on payments is

supplementary to the information on the Balance of Payments. Tourism expenditure is made in different ways (e.g. cash, debit and credit cards, traveller's checks). With regard to cash, it is not possible to trace its use, since it allows for anonymity in transactions. Therefore, even if card payments do not constitute the total payments of inbound tourism, they provide important insight into foreign tourist expenses in the host country and can contribute to the study of inbound tourism.

The shortest series begins in September 2000, but physical euro coins and banknotes entered into circulation on January 1st, 2002. Therefore, our period of analysis is between January 2003 and December 2019. Table I shows the descriptive statistics and Figures A.1 and A.2 in the Appendix show the behaviour of the variables proposed for the analysis.

[Table I around here]

On average, every month foreigners spend 2,781,114 nights in Portugal, travel and tourism receipts total 813 million Euros, the number of purchases with cards are 2,464 (thousand), which amounts to 187 million Euros. The coefficient of variation (standard deviation/mean) shows that the number of purchases series has the highest dispersion and nights spent has the lowest dispersion. They are all asymmetric and positively skewed. The series of nights spent has the lowest kurtosis.

Figures A.1 and A.2 in the Appendix show that all variables are characterized by a positive trend (as noted by the positive slope line displayed in each one). Also, all variables show a regular pattern of peaks and troughs that is increasingly marked. The growing trend in the variable Value of purchases with cards is more pronounced than the upward slope of BP-travel credit (Figure A.2).

Table II depicts the importance of payments made in Portugal with cards issued in foreign countries. In 2003 the number of purchases with these cards was 2.5% of all purchases with cards. The value of purchases with cards issued in foreign countries was 5.5% of total card purchases. In 2019, these figures were 6.7% and 10.1%, respectively. This increase is, most probably, the consequence of foreign tourism growth in Portugal.

[Table II around here]

Also, in 2003 the weight of payments with cards issued in foreign countries was 16.2% of the balance of payments travel credits and 28.1% in 2019. Thus, the share of card payments in foreign tourism grew substantially in the period considered.

Table III shows the Pearson correlation coefficients. All series have a strong positive correlation, higher than 0.9, with the exception of the correlation between the nights spent and the number of purchases with cards. Thus, the series are linked and their joint analysis provides a broader picture of foreign tourism flows in Portugal. These results are similar to the results of Saluveer *et al.* (2020) that compare mobile positioning data (MPD) and traditional tourism statistics.

[Table III around here]

In order to measure the seasonality pattern, we compute the seasonal indices of the series considered. The series cover a long period, allowing us to calculate the long-term trend as a 12-month moving average. The behaviour of the series, i.e. growth over the years and an increasingly marked intra-year pattern (see Figures A.1 and A.2 in the Appendix), indicates that the multiplicative model is the most appropriate to compute the monthly seasonal component. Thus, the monthly seasonal components $S_{t,i}$ are centered at 100, higher (lower) values indicating months with strong (weak) seasonality (Reis, 2008; Karamustafa and Ulama, 2010; Magno *et al.*, 2017).

Afterwards, the seasonal indices are computed as the average of the monthly component:

$$\bar{S}_t = \sum_{i=1}^{N} S_{t,i}/N \quad and \ t = January,...,December$$

verifying that $\sum \bar{S}_t = 12x100$, adjusting it linearly if necessary.

Seasonal indices are presented in Figure 1.

[Figure 1 around here]

The monthly indices show a similar intra year pattern of behaviour in the four series. For all of them the highest value is recorded in August, followed by July and September, as expected, due to the importance of the Sun & Sea segment for Portuguese tourism. The lowest values are observed in the winter months, January (Cards - value of purchases), February (BP - travel credit and Cards - number of purchases) and December (Nights spent).

In August, the BP and card payments series reach a higher peak than nights spent. We can interpret this result as a consequence of prices. Accommodation prices are higher in the peak season, as are prices of other tourism-related services. Furthermore, if the income of the source

market is higher in summer, the effect on tourism spending is reinforced due to demand purchasing power.

Since the monthly seasonal indices show a similar seasonality pattern, we use traditional indicators to calculate the amplitude of the seasonal effects: the weight of the 3 most important months and the coefficient of variation. Duro and Turrión-Pratt (2019) classify Portugal in the group of single-peak mountain and Ferrante *et al.* (2018) include Portugal in the group of one peak season destinations, either for domestic or foreign tourism. Thus, the use of the transportation cost approach to calculate the amplitude of seasonality is not relevant in this context.

Results

In this section, we present monthly seasonal measures. Table IV shows the seasonality indicators for this period: (1) the weight of the 3 most important months (%) and (2) the coefficient of variation (%). It should be noted that out of the four variables considered, two are measured in quantities (Nights spent and Cards - number of purchases) and the other two are measured in value (BP - travel credit and Cards - value of purchases).

<div align="center">**[Table IV around here]**</div>

The table is divided into consecutive time frames that correspond to the periods when different strategic tourism plans were in force: 2003-2006, 2007-2014 and 2015-2019. Next, we have looked into the guidelines to counter seasonality found in the different tourism plans and we comment the observed developments in seasonality.

The period 2003-2006

The first medium-term tourism plan, *Plano Nacional de Turismo* (PNT) was adopted in 1986 (Resolução do Conselho de Ministros n.º 17-B/86). Under PNT, 19 Regional Tourist Boards were created, in order to ascribe power at both local and regional scale; land-use planning was valued, as well as investments, professional training, tourist entertainment, balneotherapy and spas and promotion aimed at diversifying markets and increasing revenue (Moreira, 2018). The funding of the development of amenities (golf courses, congress centre, swimming pools and sports, recreational and cultural facilities) was one of the priorities set out for improving the use of accommodation capacity and mitigate seasonality.

Within this four-year period seasonality remained relatively stable considering the variables nights spent and BP-travel credit. The foreign card payment variable shows an increase when measured by the coefficient of variation. The slight decrease in 2004 (in Nights spent and BP-travel credit), possibly related to the organization of the UEFA European Championship finals in June, is not visible in the measurement based on payments with foreign cards.

The period 2007-2014

The next national strategic tourism plan, *Plano Estratégico Nacional do Turismo* (PENT 2007), was developed for the period 2006-2015 (Resolução do Conselho de Ministros n.º 53/2007). It recognizes the constraints on air connectivity, tourism dependency on four source markets and on the performance of three regions, Algarve, Lisboa and Madeira (mainland Portugal had been organized into five Regional Tourism Areas, in addition to the two Regional Tourism Directorates of Açores and Madeira islands). Quantified objectives for tourism growth were set for each region; the decrease in seasonality was to be achieved through the regional diversification of tourism supply. Furthermore, the development of an international market portfolio to capture the potential of proximity markets and the objective of an annual growth of 2.5% in domestic tourism were also assumed as strategies for decreasing seasonality.

The revision of PENT 2007 began in 2011 (*Turismo de Portugal*, 2011), where sustainability was assumed as the core concept of the Portuguese tourism development model. The economic sustainability goal required the development of different products (business and health & wellness), but it also acknowledged that the management of seasonality should involve effective demand management. In order to attract more tourists outside the high season, the profile of source market seasonality was analysed and specific strategies were set for each set of countries according to their seasonality.

The PENT was reviewed in 2013 (Resolução do Conselho de Ministros n.º 24/2013). Following financial market instability and the moderate economic growth of the main tourism-emitting economies the growth objectives were reviewed. The emphasis on sustainability implied, among other aspects, the focus on innovation and on the development of a seasonality management model. The plan continued to build on the 10 strategic products laid down in 2007, although each product had different priorities set for each region. Golf, business, city breaks, nautical, residential and health (medical and wellness & well-being) were the tourism products identified as more likely to counter seasonality.

Seasonality increased in the period, independently of the variables used or the seasonality indicator considered, in line with the results of Duro and Turrión-Pratts (2019). According to the information on payments with foreign cards, the highest values were achieved in 2010 for the weight of the 3 most important month indicator, and 2011 for the coefficient of variation. However, 2014 was the year with highest seasonality if we use the variables BP - travel credit information and 2013 when considering data on Nights spent. The coefficient of variation rose above 40%, independently of the variable used and the variation in this period for the BP - travel credit was as high as 13.1 percentual points.

The period 2015-2019

In 2015 the National Tourism Authority submitted a strategy with a 2020 horizon: Tourism 2020 - 5 Principles for an Ambition (*Turismo de Portugal*, 2015). One of the recognized weaknesses was high seasonality, still influenced by the dependence on the Sun & Sea product. This plan recognizes that in the low season there are fewer people traveling, especially from the main source markets to the destination, Portugal. It assumed that the only way to mitigate seasonality was to invest in products and experiences that can generate demand when less people are traveling. The plan included the affirmation of tourist entertainment as a central axis of the destination's qualification. Public financing of projects with a global scale that could anchor and give visibility to the whole national strategy were taken on board. Complementarity with smaller projects and the effort to structure the tourist entertainment offer for the purpose of adequate promotion was part of the seasonality reduction strategy.

A demand stimulus of specific demand targets, namely seniors, disabled and domestic tourists was underscored, together with an increased effort put into marketing, all the while working with the main players in every market for the development of specific products. A strong advertising campaign aimed at the consumer and trade operators would leverage the different objectives.

In 2017, the 2027 Tourism Strategy was published (Resolução do Conselho de Ministros n.º 134/2017), which laid out a 10-year strategic framework for national tourism. It was based on a participatory process that comprehended both public and private entities and included several tourism-related sectors. Seasonality decrease was identified as one of the main challenges and an ambitious target was set at 33.5% (the weight of the 3 most important months, based on nights spent) linked to social sustainability.

Seasonality measurements for the period 2015-2019 depicted in Table IV show that during this period seasonality decreased. When considering the indicator weight of the 3 most important months and the variables Nights spent and Cards - number of purchases (the variables related to quantity), the values in 2019 (respectively 35.7% and 38%) are the lowest since 2003. The coefficient of variation also presents values close to the minimum figure during the period: 36.5% and 38.8%, respectively. Thus, in this period, as inbound tourism continued to grow, seasonality decreased. However, the seasonality measurement based on expenditure-related variables (BP - travel credits and Cards - value of purchases) is higher in 2019 than in 2003. The coefficient of variation indicator in 2019 is greater than 40% (42.1% for BP-travel credit and 40.2% for Cards-value of purchases). The seasonality in receipts is still high.

Monthly growth rates in the period 2013-2019

To summarize the behaviour of the series in the period 2003-2019, we present in Table V information on: 1) the average annual growth rate of each variable and 2) the average monthly growth rate, from month i_{2003} to month i_{2019}, in ascending order.

The highest annual growth rates were registered for the variable Cards (14.6% in number of purchases and 11.2% in value of purchases), highlighting their increasing role in tourist transactions. As we reported earlier (Table II) there is a global difference in card use over this timeframe. In 2003, the first year of our analysis the use of cards was much more limited. Over time, the use of payment data to measure tourism seasonality is increasingly relevant and capable of producing more accurate results.

Nights spent grew at an annual average of 4.7%, while the variables related to expenditure (BP - travel credit and Cards - value of purchases) grew at a faster pace, emphasizing the increased importance of tourism receipts for the Portuguese economy. This evidence is compatible with Almeida *et al.* (2019), who report that individuals who go on more trips, and individuals who spend high amounts in accommodation, consider cards a safer method of payment.

[Table V around here]

Furthermore, the series did not grow in the same way in the year. Considering Nights spent, the 2 months of the year with the highest tourist flows (July and August) are those that grew the least. For the variable Cards - number of purchases, these months are somewhere in the

middle of the table. Looking at the variables directly related with tourism receipts, seasonality was reinforced since these two months are among the ones with the strongest growth rates.

Together with the information presented in Table IV, it is possible to conclude that the seasonality measured with real variables decreased from 2003 to 2019 - the strategies to combat seasonality will thus have had an effect. From a strategy based on a commitment to the development of amenities, the policies to combat seasonality gradually embraced the development of different tourist products and the need to direct promotion efforts considering the existence of different profiles in the source markets. All of which goes to show that growth in inbound tourism is feasible while decreasing seasonality at the same time.

However, a similar seasonality reduction behaviour is not observed when we measure it with value variables. A possible explanation is that the increase in seasonality is due to higher prices in tourism services in the high season months. Therefore, the revenue of the tourism enterprises is especially high in the summer, due to prices, although their demand registered a stabilizing trend along the year. Tourist income is also possibly higher in the summer, thus contributing to this effect (e.g. Turrión–Pratts and Duro, 2018; Xie, 2020).

Discussion and conclusions

Conclusions

In this study we use traditional data on inbound tourism (nights spent by foreign tourists and the travel credits of the BP) and the series of payments with cards issued in foreign countries (in quantity and in value). The specific context of our study is Portugal, a country where international tourism has grown significantly, where the Sun & Sea segment remains dominant, and that is classified as a country with a problematic seasonality situation. Also, Portugal has had for decades an extended ATM and POS network that facilitates card payments. We find evidence that card payments grew in importance, since they grew at a faster pace than the other inbound tourism variables, highlighting the growing importance of electronic payment infrastructure for the tourism industry. We show that the monthly pattern of seasonality in payments is similar to the pattern observed in the traditional demand variables. So, card payment information is useful to study foreign tourism demand.

The Portuguese tourism strategies show a growing awareness of tourism as an eminently seasonal phenomenon, and the perception of the markets and products capable of mitigating it. Therefore, we used the series mentioned to evaluate the seasonality mitigation efforts over three consecutive periods during which different tourism strategic plans were in place. We

show that the results of seasonality mitigation efforts are only evident in the last years (2015 - 2019) of the period considered in our analysis.

We also conclude that seasonality behaviour of quantity and value variables differs. Seasonality decreased when we measure it using quantity variables. However, when we use value variables, seasonality in 2019 is higher than in 2003, i.e. the first year of our analysis. This indicates that both quantity and monetary variables contribute to the knowledge of inbound seasonality tourism.

Theoretical Implications

This is the first study to use the information on payments with cards issued in foreign countries to address the pattern and evolution of inbound tourism seasonality. We argue that this data is a proxy of inbound tourism since it measures actual transactions. Also, the growing weight of card payments and digital payments, namely in a context of the COVID-19 pandemic (e.g., Cevik, 2020; Kraenzlin *et al.*, 2020), makes the payment infrastructure a differentiating factor for attracting tourists. Thus, payment data is a useful tool to study tourism phenomena.

Furthermore, the quantity variables (Nights spent and Cards - number of payments) and value variables (BP - travel credit and Cards - value of payments) show different seasonality patterns, in line with Lozano *et al.* (2021). So, the combination of both types of variables adds to the knowledge of inbound tourism seasonality.

Practical Implications

The findings highlight that policymakers can monitor the data on payments made with cards issued in foreign countries in order to measure the pattern of seasonality of inbound tourism, to evaluate their strategies of seasonality mitigation and to better understand inbound tourism expenditure. The widespread use of digital payments makes this information an increasingly better proxy of tourism activity, and since it is available in a short-time span, it has the potential of providing important information to tourism stakeholders.

There are also other practical implications for destination management organizations and companies who provide tourist services. They should be aware that seasonality in quantities and receipts does not follow the same path and that the combination of both variables is key to better determine their price policy.

Limitations and future research

This study is drawn up considering the specific context of Portugal, which is quite interesting from the tourism and payments perspective. It does not consider other countries or regions, nor does it allow for the analysis of card payments by countries of origin. Also, it computes traditional measures of monthly seasonality.

Thus, our study paves the way for future research on two aspects. First, the extension of its geographical scope, to other regions where this information is fully available, is desirable, comparing destinations with different characteristics, namely payment infrastructure and demand seasonality patterns. In this way, it would be possible to apply other approaches recently proposed in the literature, such as the transportation cost approach (Magno *et al.*, 2017) that considers destinations with different seasonality patterns. The availability of card payment data by issuing country will provide for further analysis of seasonal demand pattern by market of origin (Turrión-Pratts and Duro, 2018). Secondly, other research questions, related to the use of this data, can be asked: the possibility to perform (in a short time) forecasts of the tourism activity or to identify tourism cycles and their relationship with economic cycles are examples of such questions.

References

Almeida, A. M. F. L. (2015), "Comportamento sazonal do mercado turístico – O caso do Minho", Phd. thesis, Universidade de Aveiro.
https://ria.ua.pt/bitstream/10773/14812/1/Comportamento%20sazonal%20do%20mercado%20tur%C3%ADstico.pdf

Almeida, F., Almeida, J. and Mota, M. (2019), "Perceptions and Trends of Booking Online Payments in Tourism", *Journal of Tourism and Services,* Vol. 10 No. 18, pp. 1-15.

Barabas, M. and Schmidt, T.M. (2021), "Cash or Card? A Short Insight on the Changes caused by the COVID-19 Pandemic", *Journal of Public Administration, Finance and Law*, Issue 20.

Batista e Silva, F., Herrera, M., Rosina, K., Barranco, R., Freire, S. and Schiavina, M. (2018), "Analysing spatiotemporal patterns of tourism in Europe at high-resolution with conventional and big data sources", *Tourism Management*, Vol. 68, pp. 101-115.

Benítez-Aurioles, B. (2022), "Seasonality in the peer-to-peer market for tourist accommodation: the case of Majorca", *Journal of Hospitality and Tourism Insights*, Vol. 5 No. 2, pp. 331-349. https://doi.org/10.1108/JHTI-10-2020-0192

Brown, M., Hentschel, N., Mettler, H. and Stix, H. (2020), "Financial Innovation, Payment Choice and Cash Demand - Causal Evidence from the Staggered Introduction of Contactless Debit Cards", *SSRN Electronic Journal*.

Cevik, S. (2020), "Dirty money: Does the risk of infectious disease lower demand for cash?" *International Finance,* Vol. 23 No. 3, pp. 460–471.

Chen, H., Engert, W., Felt, M.-H., Huynh, K. P., Nicholls, G., O'Habib, D. and Zhu, J. (2021), "Cash and COVID-19: The impact of the second wave in Canada", staff discussion paper 2021-12, Bank of Canada, Ottawa, 23 July.
https://www.bankofcanada.ca/wp-content/uploads/2021/07/sdp2021-12.pdf

Choe, Y., Kim, H. and Joun, H. J. (2019), "Differences in tourist behaviors across the seasons: The case of Northern Indiana", *Sustainability*, Vol. 11 No. 16, 4351.

Cisneros-Martínez, J. D. and Fernández-Morales, A. (2015), "Cultural tourism as tourist segment for reducing seasonality in a coastal area: the case study of Andalusia", *Current Issues in Tourism*, Vol. 18 No. 8, pp. 765-784.

Cisneros-Martínez, J. D., McCabe, S. and Fernández-Morales, A. (2018), "The contribution of social tourism to sustainable tourism: a case study of seasonally adjusted programmes in Spain", *Journal of Sustainable Tourism*, Vol. 26 No. 1, pp. 85-107.

Connell, J., Page, S. J. and Meyer, D. (2015), "Visitor attractions and events: Responding to seasonality", *Tourism Management*, Vol. 46, pp. 283-298.

Duro, J. (2018), "Seasonality of tourism: A new decomposition", *Tourism Economics,* Vol. 24 No. 5, pp. 615-621.

Duro, J. and Turrión-Prats, J. (2019), "Tourism seasonality worldwide", *Tourism Management Perspectives*, Vol. 31, pp. 38-53.

Esteves, P. S. (2009), "Are ATM/POS data relevant when nowcasting private consumption? " working paper 25/2009, Banco de Portugal, Lisboa, Novembro.
https://www.bportugal.pt/sites/default/files/anexos/papers/wp200925.pdf

Eurostat (2021), *Tourism statistics. Annual Data*, available at:
https://ec.europa.eu/eurostat/web/tourism/data/database (accessed 10 October 2021).

Evans, D. S. and Abrantes-Metz, R. M. (2014), "The Economics and Regulation of the Portuguese Retail Payments System", *SSRN Electronic Journal*, pp. 1-66.

Fernández-Morales, A. and Mayorga-Toledano, M. C. (2008), "Seasonal concentration of the hotel demand in Costa del Sol: A decomposition by nationalities", *Tourism Management*, Vol. 29 No. 5, pp. 940-949.

Fernández-Morales, A., Cisneros-Martínez, J. and McCabe, S. (2016), "Seasonal concentration of tourism demand: Decomposition analysis and marketing implications", *Tourism Management,* Vol. 56, pp. 172-190.

Fernández-Morales, A. and Cisneros-Martínez, J. D. (2019), "Seasonal concentration decomposition of cruise tourism demand in southern Europe", *Journal of Travel Research*, Vol. 58 No. 8, pp. 1389-1407.

Ferrante, M., Magno, G. and De Cantis, S. (2018), "Measuring tourism seasonality across European countries", *Tourism Management*, Vol. 68, pp. 220-235.

Fujiki, H. and Tanaka, M. (2018), "How do we choose to pay using evolving retail payment technologies? Evidence from Japan", *Journal of the Japanese and International Economies*, Vol. 49, pp. 85–99.

García, M. and del Mar, M. (2021), "Golf tourism in Almería and its seasonality", *Pasos: Revista de Turismo y Patrimonio Cultural*, Vol. 19 No. 4, pp. 763-773.

Getz, D. and Page, S. J. (2016), "Progress and prospects for event tourism research", *Tourism Management*, Vol. 52, pp. 593-631.

Gul, K. (2014), "The effect of using credit cards on domestic and the international Turkish tourism demand in globalization", *Global Business and Economics Research,* Vol. 3 No. 10, pp. 1-13.
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.975.5751&rep=rep1&type=pdf

Ho A., Morin L, Paarsch H. and Huynh K. (2022), "A flexible framework for intervention analysis applied to credit-card usage during the coronavirus pandemic", *International Journal of Forecasting*, Vol. 38 Issue 3, pp. 1129-1157.

IMF (2009), *Balance of payments and international investment position manual* (6th ed.).
https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf

INE (2020)*, Atividade Turística,* available at:
https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_destaques&DESTAQUESdest_boui=353908971&DESTAQUESmodo=2 (accessed 14 February 2020)

Karamustafa, K. and Ulama, S. (2010), "Measuring the seasonality in tourism with the comparison of different methods", *EuroMed Journal of Business* Vol. 5 No.2, pp. 191-214.

Khanra, S., Dhir, A., Kaur, P. and Joseph, R. (2021), "Factors influencing the adoption postponement of mobile payment services in the hospitality sector during a pandemic", *Journal of Hospitality and Tourism Management,* Vol. 46, pp. 26-39.

Koenig-Lewis, N. and Bischoff, E. (2005), "Seasonality research: the state of the art", *International Journal of Tourism Research,* Vol. 7 Issue 4-5, pp.201-219.

Koenig-Lewis, N. and Bischoff, E. E. (2010), "Developing effective strategies for tackling seasonality in the tourism industry", *Tourism and Hospitality Planning & Development,* Vol. 7 Issue 4, pp. 395-413.

Kraenzlin, S., Meyer, C. and Nellen, T. (2020), "COVID-19 and regional shifts in Swiss retail payments", *Swiss Journal of Economics and Statistics*, Vol. 156 No. 14.

Li, J., Xu, L., Tang, T., Wang, S. and Li, L. (2018), "Big data in tourism research: A literature review", *Tourism Management,* Vol. 68, pp. 301-323.

Lozano, J., Rey-Maquieira, J. and Sastre, F. (2021), "An Integrated Analysis of Tourism Seasonality in Prices and Quantities, with an Application to the Spanish Hotel Industry", *Journal of Travel Research, Vol. 60 No.* 7, pp. 1581-1597.

Magno, G., Ferrante, M. and De Cantis, S. (2017), "A new index for measuring seasonality: A transportation cost approach", *Mathematical Social Sciences*, Vol. 88, pp. 55-65.

Martín, J., Aguilera, J. and Moreno, V. (2014), "Impacts of Seasonality on Environmental Sustainability in the Tourism Sector Based on Destination Type: An Application to Spain's Andalusia Region", *Tourism Economics,* Vol. 20 No.1, pp. 123-142.

Martín, J. M. M., Fernández, J. A. S. and Martín, J. A. R. (2019), "Comprehensive Evaluation of the Tourism Seasonality Using a Synthetic DP2 Indicator", *Tourism Geographies*, Vol. 21 Issue 2, pp. 284-305.

Marton, G., Hinek, M., Kiss, R. and Csapó, J. (2019), "Measuring seasonality at the major spa towns of Hungary", *Hungarian Geographical Bulletin*, Vol. 68 No. 4, pp. 391-403.

McElroy, T., Monsell, B. and Hutchinson, R. (2018), "Modeling of Holiday Effects and Seasonality in Daily Time Series", research report series 2018-01, U.S. Census Bureau, Washington D.C., 23 January. https://www.census.gov/content/dam/Census/library/working-papers/2018/adrm/rrs2018-01.pdf

Miniaoui, S., Muammar, S., El Hendy, M., Atallah, S. and Hashim, K. (2019), "Innovative Payment System for Hospitality Sector using Near Field Communication Smart Bracelet and Arduino", *TEM Journal,* Vol. 8 Issue 3, pp. 1094-1099. http://www.temjournal.com/content/83/TEMJournalAugust2019_1094_1099.pdf

Moreira, C. O. (2018), "Portugal as a tourism destination. Paths and trends", *Méditerranée. Revue géographique des pays méditerranéens / Journal of Mediterranean geography*, Vol. 130.

Nadal, J., Font, A. and Rosselló, A. (2004), "The economic determinants of seasonal patterns", *Annals of Tourism Research,* Vol 31 Issue 3, pp. 697-711.

Ozturk, A.B. (2016), "Customer acceptance of cashless payment systems in the hospitality industry", *International Journal of Contemporary Hospitality Management*, Vol 28 No. 4, pp. 801-817.

Passah, D. and Kumar, A. (2019), "Cashless Economy and Digitalization of Tourism & Hospitality Practices in India", paper presented at Proceedings of 10th International Conference on Digital Strategies for Organizational Success.

http://dx.doi.org/10.2139/ssrn.3308586

Peng, R., Xiong, L. and Yang, Z. (2012), "Exploring Tourist Adoption of Tourism Mobile Payment: An Empirical Analysis", *Journal of Theoretical and Applied Electronic Commerce Research,* Vol. 7 No. 1*,* pp. 21-33.

Reis, E. (2008), *Estatística Descritiva*, Edições Sílabo, Lisboa.

Resolução do Conselho de Ministros n.º 17-B/86, Diário da República n.º 37/1986, 1º Suplemento, Série I de 1986-02-14, pp. 2 – 5, available at:

https://dre.pt/dre/detalhe/resolucao-conselho-ministros/17-b-1986-508179

Resolução do Conselho de Ministros n.º 53/2007, Diário da República n.º 67/2007, Série I de 2007-04-04, pp. 2166 – 2174, available at:

https://dre.pt/dre/detalhe/resolucao-conselho-ministros/53-2007-520229

Resolução do Conselho de Ministros n.º 24/2013, Diário da República n.º 74/2013, Série I de 2013-04-16, pp. 2170 – 2202, available at:

https://dre.pt/dre/detalhe/resolucao-conselho-ministros/24-2013-260429

Resolução do Conselho de Ministros n.º 134/2017, Diário da República n.º 187/2017, Série I de 2017-09-27, pp. 5522 – 5532, available at:

https://dre.pt/dre/detalhe/resolucao-conselho-ministros/134-2017-108219721

Rosselló-Nadal, J. and He, J. (2020), "Tourist arrivals versus tourist expenditures in modelling tourism demand", *Tourism Economics Journal,* Vol. 26 No. 8, pp. 1311-1326.

Rosselló, J. and Sansó, A. (2017), "Yearly, monthly and weekly seasonality of tourism demand: A decomposition analysis", *Tourism Management,* Vol. 60, pp. 379-389.

Saluveer, E., Raun, J., Tiru, M., Altin, L., Kroon, J., Snitsarenko, T., Aasa, A. and Silm, S. (2020), "Methodological framework for producing national tourism statistics from mobile positioning data", *Annals of Tourism Research,* Vol. 81, 102895.

SIBS (2008), *Dossier 25 anos da SIBS*, available at:

http://www.sibs.pt/export/sites/sibs_fps/pt/documentos/Dossier-25-Anos-SIBS.pdf. (accessed 14 February 2020)

Turismo de Portugal (2011), *Plano Estratégico Nacional do Turismo, Propostas para Revisão no Horizonte 2015 - V 2.0*, Lisboa: Turismo de Portugal I.P.

Turismo de Portugal (2015), *Turismo 2020: Cinco princípios para uma ambição*, Lisboa: Turismo de Portugal, I.P.

Turkay, B., Dincer, F. and Dincer, M. (2019), "An evaluation of new values in economy and their impacts on future transformation in tourism", *Procedia Computer Science,* 158, 1095-1102.

Turrión-Prats, J. and Duro, J. (2018), "Tourist seasonality and the role of markets", *Journal of Destination Marketing & Management*, Vol. 8, pp. 2331.

Vergori, A. S. and Arima, S. (2020), "Cultural and non-cultural tourism: Evidence from Italian experience", *Tourism Management*, Vol. 78, 104058.

Xie, J. (2020), "The economic determinants of tourism seasonality: A case study of the Norwegian tourism industry", *Cogent Business & Management,* Vol 7 No. 1, 1732111.

Worthington, S., Thompson, F. and Stewart, D. (2011), "Credit cards in a Chinese cultural context - The young, affluent Chinese as early adopters", *Journal of Retailing and Consumer Services,* Vol. 18 Issue 6, pp. 534-541.

Wulandari, N. (2017), "Cashless Payment in Tourism. An Application of Technology Acceptance Model", *Journal of Environmental Management and Tourism,* Vol. 8 No. 8, pp. 1550-1553.

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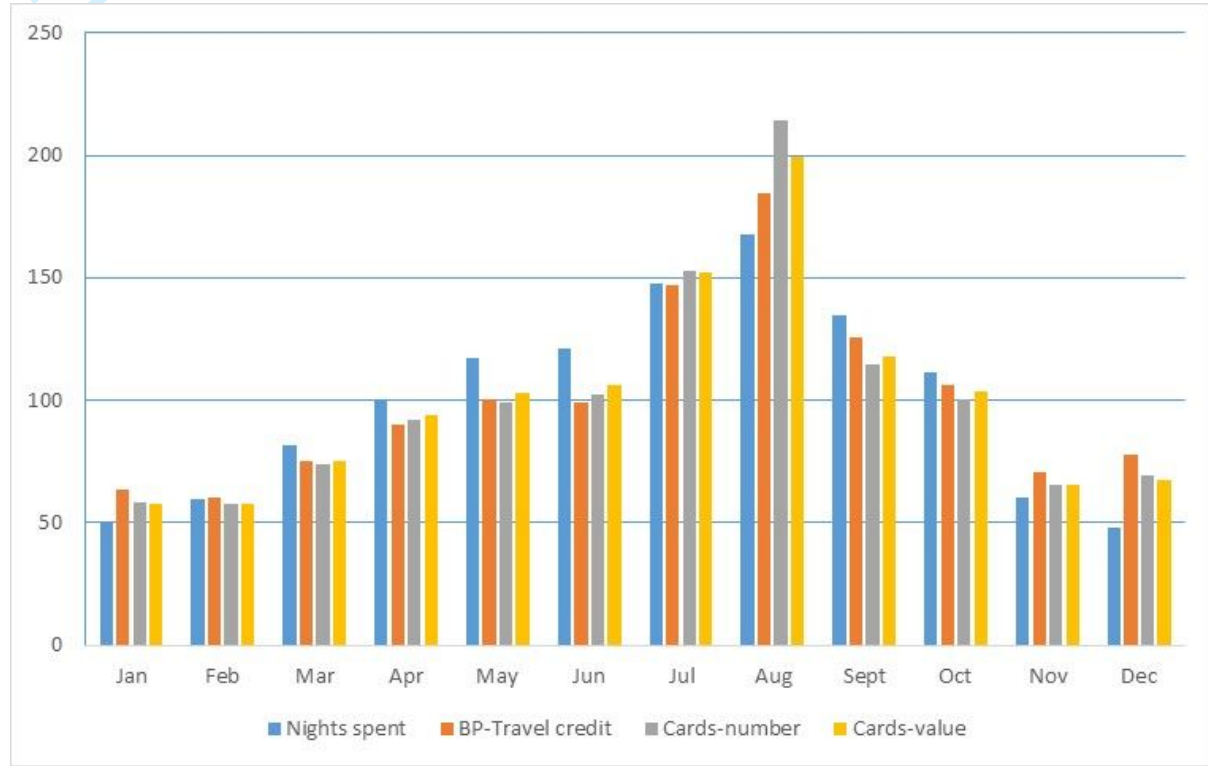
Figure 1: Seasonal monthly indices (2003-2019)

Figure 1: Seasonal monthly indices (2003-2019)

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	Mean	Median	Min	Max	Standard deviation	CV=SD/Mean	Skewness	Kurtosis
Nights spent	2,781,114	2,480,107	983,174	6,706,219	1,352,101	0.55	0.81	0.02
BP - travel credit	813	673	312	3,020	474.2	0.7	2.02	4.87
Cards - number of purchases	2,464	1,539	463	14,413	2,324.9	1.51	2.19	5.54
Cards - value of purchases	187	142	28	820	136.3	0.96	1.86	4.06

Table I: Descriptive statistics.

	2003	2019
Total cards - number of purchases (thousands)	411730	1362766
Total cards - value of purchases (millions of euros)	17395.5	51527.6
Cards issued in foreign countries - number of purchases (thousand)	10306	91763
Cards issued in foreign countries - value of purchases (million euros)	949.3	5187.4
Number of purchases with cards issued in foreign countries (% of total)	2.5%	6.7%
Value of purchases with cards issued in foreign countries (% of total)	5.5%	10.1%
BP - travel credit (million euros)	5848.91	18430.72
Value of purchases with cards issued in foreign countries (% of BP-travel credit)	16.2%	28.1%

Source: Banco de Portugal

Table II: Portugal - Importance of payments with cards issued in foreign countries

	Nights spent	BP - travel credit	Cards - number of purchases	Cards - value of purchases
Nights spent	1			
BP - travel credit	0.919	1		
Cards - number of purchases	0.834	0.952	1	
Cards - value of purchases	0.900	0.985	0.981	1

Table III: Coefficients of correlation

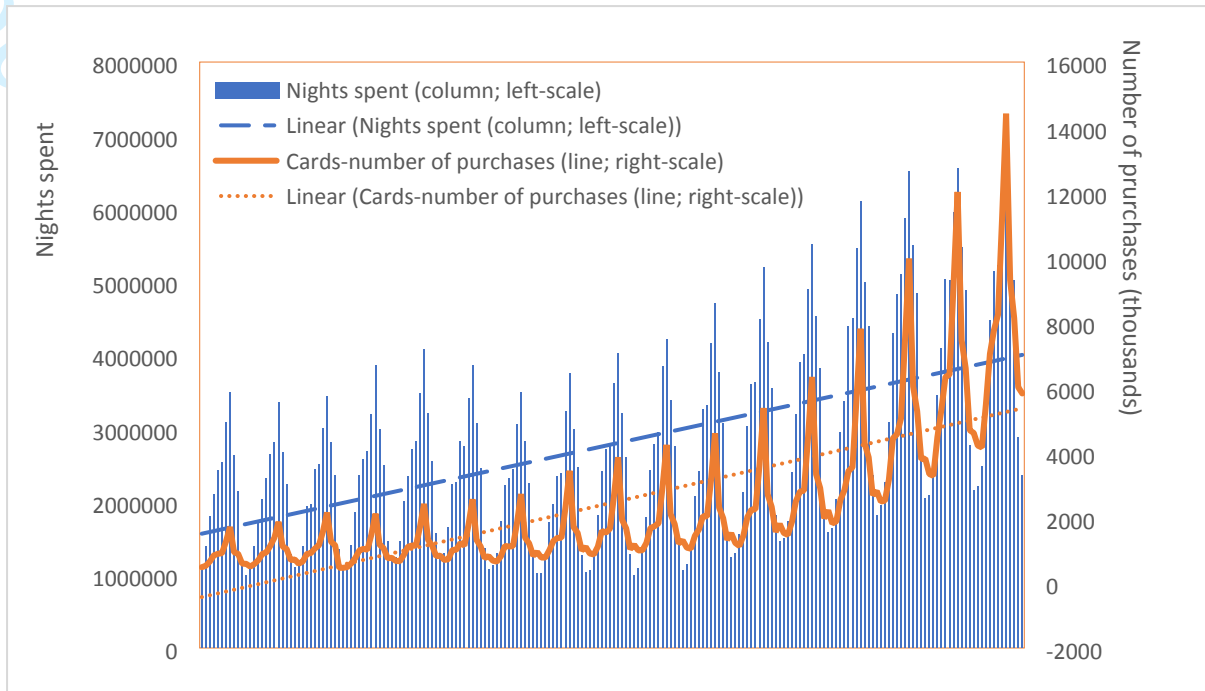| Years	Nights spent		Cards - number of purchases		BP - travel credit		Cards - value of purchases	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
2003	37.0	38.6	38.1	40.9	36.2	31.8	36.6	36.4
2004	35.9	36.3	38.1	40.0	35.3	31.1	37.0	36.4
2005	36.3	36.1	40.5	48.0	35.8	31.3	40.7	50.3
2006	36.9	37.9	39.0	43.1	36.1	32.9	37.8	41.3
2007	37.5	38.7	39.4	43.2	36.3	32.9	37.7	37.8
2008	36.6	37.5	39.9	44.9	35.8	30.8	38.0	39.0
2009	37.4	38.6	41.1	48.1	36.9	33.6	39.7	46.3
2010	39.2	42.6	45.0	51.1	37.7	36.1	43.7	46.8
2011	39.1	44.5	42.3	51.3	37.7	36.1	41.3	47.8
2012	39.4	44.6	42.1	50.7	37.8	36.0	41,0	46.8
2013	39.4	45.3	41.6	49.7	40.8	45.0	40.1	45.1
2014	38.6	44.0	42.2	51.2	41.3	46.0	40.6	46.3
2015	38.3	42.9	41.2	48.1	40.9	44.7	39.9	44.0
2016	37.6	41.3	41.1	47.1	41.6	46.2	40.7	45.8
2017	36.6	39.5	40.1	44.0	39.1	45.3	39.7	43.2
2018	36.0	37.2	38.9	40.9	40.4	43.6	39.1	41.9
2019	35.7	36.5	38.0	38.8	39.9	42.1	38.4	40.2

(1) Weight of the 3 most important months (%); (2) Coefficient of variation (%)

Table IV: Seasonality measures (2003-2019)

| Nights spent		Cards - number of purchases		BP - travel credit		Cards - value of purchases	
Average annual growth rate	4.7%	Average annual growth rate	14.6%	Average annual growth rate	7.4%	Average annual growth rate	11.2%
Month	Average growth rate	Month	Average growth rate	Month	Average growth rate	Month	Average growth rate
Feb	0.300%	Feb	1.084%	Dec	0.497%	Feb	0.821%
Mar	0.334%	Apr	1.110%	Feb	0.509%	Mar	0.845%
Aug	**0.341%**	Mar	1.111%	Nov	0.538%	Oct	0.856%
Jul	**0.354%**	**Aug**	**1.114%**	Mar	0.555%	Apr	0.861%
Jan	0.362%	Mai	1.133%	Oct	0.559%	Jan	0.873%
Jun	0.378%	Jan	1.137%	Jan	0.569%	Mai	0.879%
Mai	0.394%	**Jul**	**1.139**%	Apr	0.593%	Nov	0.880%
Apr	0.396%	Jun	1.154%	**Jul**	**0.613%**	Jun	0.901%
Sep	0.399%	Oct	1.157%	Mai	0.614%	Sep	0.911%
Oct	0.445%	Sep	1.202%	Jun	0.631%	**Aug**	**0.913%**
Nov	0.445%	Dec	1.204%	Sep	0.645%	**Jul**	**0.919%**
Dec	0.457%	Nov	1.216%	**Aug**	**0.686%**	Dec	0.926%

Table V: Monthly average growth rate (%), month i2003 - month i2019

Appendix

Source: Banco de Portugal

Figure A.1. Quantity variables - Nights spent by residents in foreign countries and Number of purchases with cards
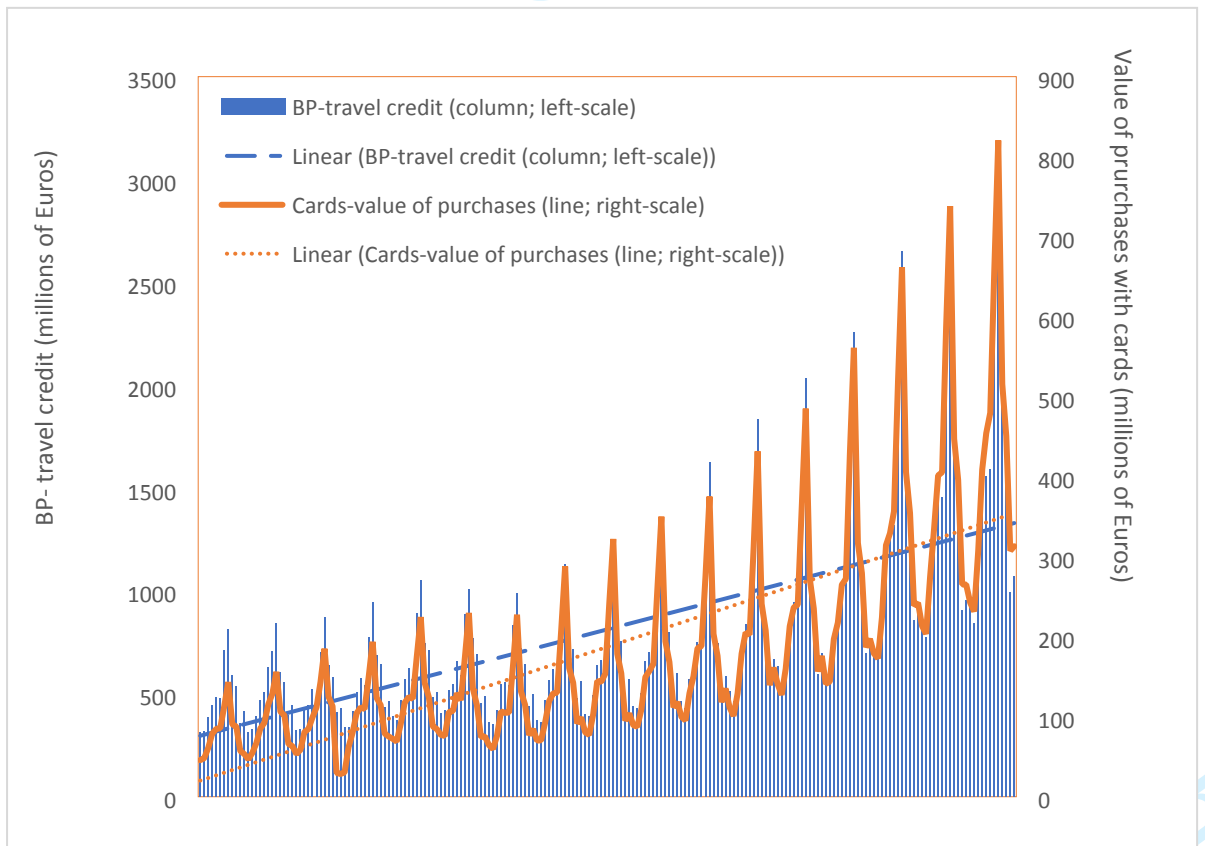
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Figure A.2. Value variables – BP travel credit and Value of purchases with cards

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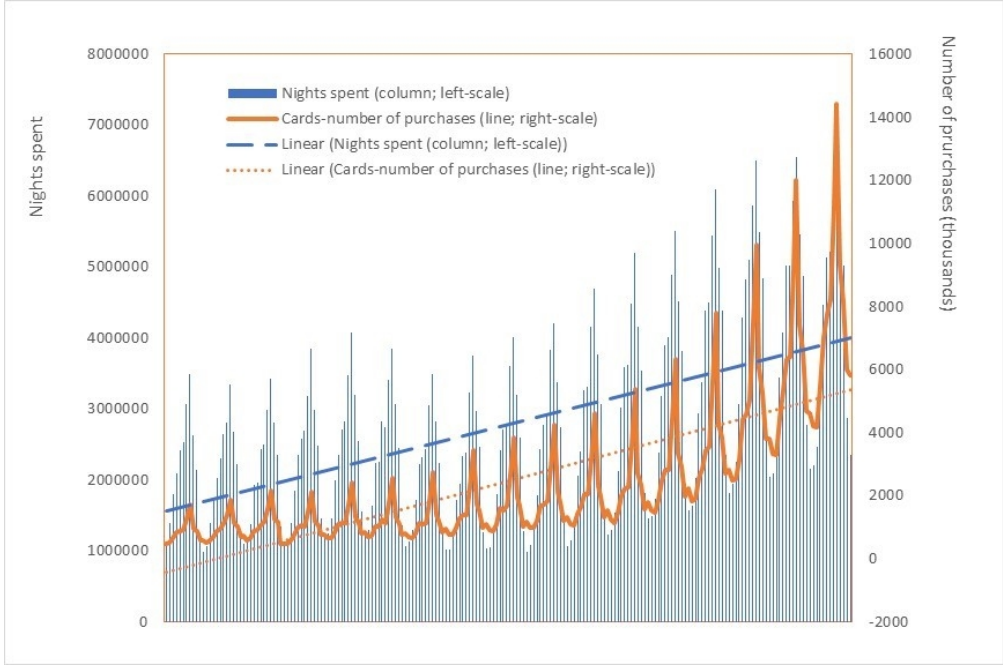51
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Figure A.1. Quantity variables - Nights spent by residents in foreign countries and Number of purchases with cards / Source: Banco de Portugal

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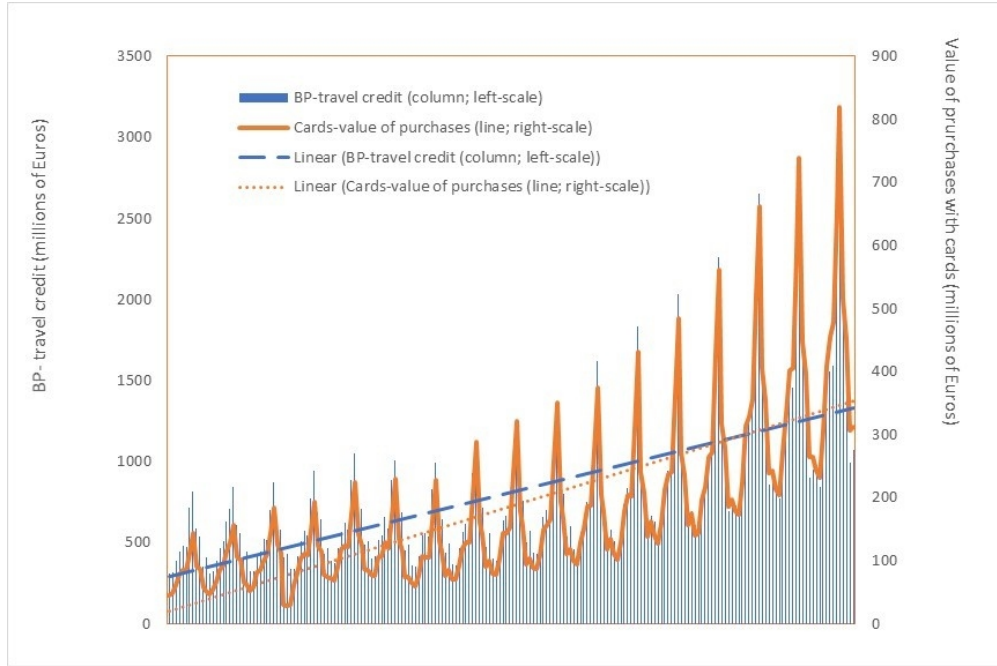51
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Figure A.2. Value variables – BP travel credit and Value of purchases with cards / Source: Banco de Portugal

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