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Economy and religious tourism: The phenomenon of pilgrimages to Marian Sanctuaries

(Versão definitiva após defesa pública)

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Resumo

Há séculos as peregrinações estão presentes no cristianismo. Para os católicos é indiscutível a importância das devoções e visitas aos Santuários marianos. O número de pessoas que visitam e peregrinam a esses espaços influenciam a economia local. Para compreender os determinantes econômicos do turismo religioso mariano foram estudados dois Santuários, nomeadamente, Aparecida (Brasil) e Fátima (Portugal). Dado o grande acervo de informações estatísticas do santuário português, verificou-se, através do modelo *Vector Autoregressive*, que o Produto Interno Bruto e o Desemprego influenciam unidirecionalmente as peregrinações. O modelo *Autoregressive Distributed Lag* revelou que o aumento do Produto Interno Bruto e das chegadas internacionais no curto prazo impactam positivamente o número de peregrinos. Por meio da regressão *Ordinary Least Squares* foram encontradas relações estatísticas significantes entre fatores climáticos (volume de chuva e temperatura média) e visitantes no Santuário de Fátima. O método de previsão *Sazonal Autoregressive Integrated Moving Average* foi aplicado nas séries (i) número de visitantes mensais do Santuário de Aparecida; e (ii) número de peregrinos no Santuário de Fátima. Os resultados revelam uma forte sazonalidade e que os primeiros e últimos meses do ano são os períodos de baixa procura. Os resultados deste estudo permitem um novo olhar para o turismo religioso no contexto mariano, os resultados empíricos permitem que os responsáveis por estabelecerem políticas públicas, agentes do turismo e a administração dos Santuários direcionem suas ações. Ações planejadas e executadas em conjunto entre os diversos agentes podem beneficiar os residentes, visitantes, peregrinos, o setor do turismo e os próprios Santuários.

Palavras-chave: Peregrinações; Santuários Marianos; Turismo Religioso; Economia e Turismo; Políticas Públicas.

Resumo Alargado

A primeira aparição mariana de que se tem relato terá ocorrido, segundo a tradição cristã, por volta do século I, em Espanha. Existem relatos de mais de duas mil aparições, sendo, no entanto, apenas 16 reconhecidas pelo Vaticano. No mundo, entre os maiores santuários dedicados ao culto mariano encontram-se Aparecida (no Brasil) e Fátima (em Portugal).

As “aparições marianas”, ao redor do mundo, há séculos que fazem com que as pessoas, maioritariamente os crentes, se desloquem para contemplar este fenómeno ou para estarem no mesmo lugar onde ocorreram. As peregrinações - como são chamadas estas visitas turística-religiosa - movimentam milhares de pessoas todos os anos e contribuem de modo relevante para o desenvolvimento da economia local.

A peregrinação é, comumente, entendida como rezar com os pés. De fato, as longas distâncias são percorridas, muitas vezes a pé. Fazendo uso dos escritos de São João da Cruz, entende-se a mortificação do corpo, sendo uma prática simples para os cristãos, “um leve incômodo” optativo e muito tradicional na Igreja. A ideia da mortificação é morrer para os desejos da carne e viver para o amor de Deus. De fato, vê-se muitas vezes na automortificação uma variante do ascetismo mundano (Aran et al., 2008; Neves, 1992; Sciadini, 1991).

Os visitantes e peregrinos aos santuários marianos de Fátima (Portugal) e Aparecida (Brasil) são os objetos desta investigação. A ligação histórica de colônia e colonizador, aproximação cultural, linguística e religiosa, permitem diversas comparações entre os Santuários das duas nações. A dimensão (física e intangível) dos templos fez deles referências mundiais. Por isso um número expressivo de peregrinos se põe a caminho todos os anos. Durante deslocamento as pessoas interagem com a economia local, demandando uma série de produtos e serviços, públicos e privados.

O Santuário brasileiro, através do seu Serviço de Imprensa, forneceu dados mensais para o período de 2012 a 2017. E o santuário português, através do seu Serviço de Estudos e Difusão, forneceu o número de peregrinos para duas das séries temporais (dados anuais de 1994 a 2017; e dados mensais de 2008 a 2017) e o número de visitantes para o ano 2015 (dados de 01/01/2015 a 31/12/2015).

Segundo dados da Vatican Secretary of State (2016), o número de cristãos católicos cresceu na última apuração oficial da Igreja. Os dados apurados, a partir do número de batizados realizados em todas dioceses ao redor do mundo, passaram de 1115 milhões para 1254 milhões, entre 2005 e 2013. O crescimento dá-se ao longo de todos os anos observados. Dados do Pew Research Center (2015), revelam que o

número de cristãos, já em 2010, era 31,4% da população mundial e a que Igreja Católica Apostólica Romana cresceu a uma taxa superior à expansão da população mundial.

Portugal e Brasil encontram no turismo uma importante fonte de receitas. E o potencial do turismo religioso não deve ser ignorado. Por isso compreender o impacto económico das peregrinações é vital para o desenvolvimento e crescimento do setor turismo e do próprio turismo religioso. Do mesmo modo, compreender o que motiva a peregrinação do ponto de vista económico pode trazer oportunidades de melhoria em serviços e produtos dos agentes envolvidos com o turismo religioso. A elaboração de conhecimento científico empírico pode favorecer o debate sobre a necessidade de adaptação, melhoria e trabalho em conjunto dos pesquisadores, Estado, Igreja e os agentes privados.

Algumas economias dependem diretamente do turismo. Em 2016 as viagens e turismo contribuíram com mais de 50% do PIB para os quatro primeiros países da lista do World Travel and Tourism Council (WTTC, 2016). É comum encontrar autoridades que orientam suas economias para obter mais receita de turismo (Aydin, 2016). Por isso o objetivo geral desta dissertação é colaborar empiricamente para compreensão dos determinantes económicos do turismo religioso mariano (ou Peregrinações marianas) em Portugal e elucidar sobre a relação “economia e peregrinações”.

Os objetivos específicos consistem em: (i) apresentar os resultados empíricos da relação das variáveis económicas com as Peregrinações marianas de Fátima (através de modelos quatro modelos econométricos, nomeadamente: *Vector Autoregressive* (VAR); *Autoregressive Distributed Lag* (ARDL); *Sazonal Autoregressive Integrated Moving Average* (SARIMA); e *Ordinary Least Squares* (OLS); (ii) Aferir a relação entre clima e visitas ao Santuário de Fátima; e (iii) prever o número futuro de peregrinos para o Santuários de Aparecida e Fátima.

O turismo tornou-se uma oportunidade muito importante para qualquer governo (Aydin, 2016). É uma fonte de renda para as famílias residentes e empresas do destino (Incera & Fernández, 2015). Em alguns casos a atração turística pode gerar externalidades negativas, fato que corrobora com Benavides (2015) que afirma que nem sempre o turismo gera benefícios para o destino.

As viagens por fins religiosos são entendidas como mais um agente responsável por movimentar a economia local (Aulet et al., 2017). O conceito de turismo está geralmente ligado ao desenvolvimento e engloba um número crescente de novos destinos (World Tourism Barometer, 2016).

Em 2017, as chegadas de turistas internacionais cresceram em todo mundo, notáveis 7%, atingindo mais de 1.322 milhões e ainda há uma ótima expectativa de crescimento para o ano de 2018 (UNWTO, 2018). A alta receita do turismo pode se tornar um grande fator orçamentário e substituir outros ramos da atividade econômica (Kurmanaliyeva et al., 2014).

O interesse crescente em Turismo e Crescimento levou Brida et al. (2016) a fazerem uma exaustiva revisão bibliográfica, onde com algumas exceções, os resultados sugerem que o turismo internacional global impulsiona o crescimento econômico.

A relação entre turismo e economia é sustentada pela contribuição para o crescimento das economias regionais (Incera & Fernández, 2015). Balaguer & Cantavella-Jordá (2002), foram os primeiros a testar a hipótese de crescimento econômico liderada pelo turismo (TLGH), os resultados apontaram o turismo como fator de crescimento do PIB espanhol no longo prazo.

Atualmente diversos pesquisadores buscam compreender os efeitos do turismo na economia (Croes et al., 2018; Chulaphan & Barahona, 2017; Pérez-Rodríguez et al., 2015). São 4 as hipóteses da relação entre crescimento econômico liderado pelo turismo: (i) crescimento; (ii) conservação; (iii) *feedback*; e (iv) neutralidade.

Desde de Weber há um entendimento que a prosperidade econômica de algumas regiões era atribuída à religião protestante. Becker & Woessmann (2009) colaboram para o debate fornecendo uma teoria alternativa, onde o capital humano é crucial para a prosperidade econômica, ou seja, relacionam a prosperidade econômica e melhor educação aos protestantes.

A religião pode ser considerada um instrumento poderoso de interação social. Lim & Putnan (2010) argumentam que a maior satisfação observada entre pessoas religiosas pode ser explicada, sobretudo, pelo nível de ligação que ocorre em serviços religiosos. Van Ingen & Moor (2015) salientam que a frequência em serviços religiosos tem estado em declínio notável no Ocidente. Porém existe uma variação específica por país (a queda é evidente na Bélgica, os EUA (Estados Unidos da América) mantem-se estável e há casos de inversão da tendência, como a Romênia).

Sendo a frequência a ritos religiosos uma medida evidente do nível de religiosidade em dado território, é natural que os indivíduos que a pratiquem acabem por estar mais integrados em termos de comunidade. Lewis et al. (2013) demonstram que tal efeito reforça o surgimento de redes de apoio e proteção.

Por todo mundo existem centenas de santuários e templos, locais sagrados, onde, crentes (e não crentes) dos mais diversos credos os visitam, buscando (ou não) o seu encontro com o sagrado.

Há centenas de anos as viagens por fundamentação religiosa se fazem presente na história da humanidade. É da terra dos faraós que se desenvolverá a grande peregrinação do povo Hebreu (Pontifício Conselho para a Pastoral dos Migrantes e Itinerantes, 1998). Este êxodo deu-se por volta de 1250 a.C. (Bíblia Sagrada, 1990, pp. 65) quando o povo peregrinou em busca da terra prometida por seu Deus *Iahweh*. O mesmo Deus que anteriormente indicou a Abrão e sua família que saísse de sua terra, esta possivelmente foi a primeira peregrinação motivada por fé, que se tenha relatos (Bíblia de Jerusalém, 2013, pp. 49).

Ainda em contexto histórico, durante o reinado de Salomão foi construído o Primeiro Templo, em Jerusalém no Oriente Médio; este passou a receber milhares de peregrinos todos os anos para comemorar a festa da libertação (Pessach). A busca pela expiação dos pecados e a apresentação do primogênito do sexo masculino eram outros preceitos religiosos que justificavam no passado viagens a Jerusalém. Séculos depois, após a conquista árabe de Jerusalém no ano 638 d.C, torna-se mais árduo o encontro com as memórias cristãs da Terra Santa, e abre-se novos itinerários de peregrinação no Ocidente.

Rinschede (1992), define a mobilidade do turismo religioso como sendo de forma exclusiva ou fortemente motivada por razões religiosas. Esta definição vai de encontro com Alvarado-Sizzo et al. (2017), que afirmam que a fé é uma razão forte para viajar.

Há séculos as cidades tem-se preocupado com o planejamento urbano. Os locais sagrados, devem seu desenvolvimento urbano e econômico ao crescimento do turismo e à chegada dos peregrinos (Alvarado-Sizzo et al., 2017). No passado em Jerusalém, um mês antes do *Pessach*, suas estradas eram reformadas e os poços artesianos restabelecidos, a fim de garantir o máximo conforto dos peregrinos.

O modelo VAR foi aceito como exógeno maioritariamente, sua probabilidade estatística de 1%. Em suma a Desemprego e GDP causam peregrinações a 1% e surpreende as peregrinações tem relação causal unidirecional com a globalização a 10%. A variável globalização é composta por indicadores sociais e culturais que cresceram ao mesmo tempo que mais peregrinos internacionais desembarcaram em Portugal para visitar o Santuário, sendo esta uma das justificativas da existência de relação estatística entre as variáveis. Na tabela A5, no apêndice, vê-se os resultados completos e uma ilustração do fluxo que resume os resultados do modelo.

Os testes de robustez foram aplicados ao modelo e revelam através do Wald lag exclusion que o número de lags foi assertivo, com χ^2 de 1% para todas variáveis e para o modelo.

Os resultados do modelo ARDL apresentam ECM de -2.03 e \bar{R}^2 de 0.84%, valores aceitáveis para uma estimação. Nota-se que, quando a peregrinação aumenta 1%, há um aumento de 0.46% nas peregrinações no curto prazo. As chegadas internacionais e o GDP tem efeito positivo sobre as peregrinações no curto prazo, 1.33% e 3.28%, respectivamente. O desemprego revela um baixo impacto no curto prazo, quando aumenta 1% as peregrinações aumentam 0.08%. No longo prazo o GDP e o desemprego tem efeito negativo nas peregrinações -1.74 e -0.01, respectivamente. Os gastos com serviços de viagens aparecem com um sinal positivo no longo prazo, ou seja, quando aumenta em 1% as despesas com viagens, aumentam as peregrinações em 0.55%.

Uma bateria de testes pós estimação foram executados para suportar os resultados apresentados pelo modelo (Jarque-Bera, LM test, ARCH, BPG e RESET) e todos apresentaram resultados dentro da normalidade. A estabilidade dos coeficientes foi observada através dos testes CUSUM e CUSUM of squares.

Os modelos de Previsão ARIMA indicam R^2 de 0.89% e 0.84% para os Santuários de Fátima e Aparecida, respectivamente. O *Theil Inequality Coefficient* do Santuário de Aparecida é de 0.321, *Bias Proportion* que correspondente a 0,000%, a *Variance Proportion* a 0,001 e a *Covariance Proportion* é de 0,998. Enquanto para o Santuário de Fátima tem o valor de 0.491 para o *Theil Inequality Coefficient*, *Bias Proportion* que corresponde a 0,000%, a *Variance Proportion* a 0,083 e a *Covariance Proportion* é de 0,917.

O sistema executou o ajustamento automático da amostra de Aparecida para o período de abril de 2013 e abril de 2009 para Fátima. Tratando-se de séries mensais, definiu-se doze meses como o período de previsão. Ainda é possível notar um forte padrão de sazonalidade nas peregrinações ao Santuário de Fátima e as visitas ao Santuário de Aparecida.

O modelo OLS que busca explicar o número de visitas diária ao Santuário de Fátima possui ótimos valores para o R^2 e \bar{R}^2 , respectivamente 0.85% e 0.84%. A probabilidade estatística para as variáveis explicativas de é 1%. Fuinhas et al. (2018) propuseram a hipótese que os fatores climáticos poderiam impactar as peregrinações. O coeficiente negativo na variável chuva, revela o que era espectável, um impacto negativo no número de pessoas que se desloca até o santuario mariano e que quando a temperatura média do dia sobe, há impacto positivo com o maior número de pessoas que chegam a Fátima.

As variáveis consumo de energia elétrica e taxa de câmbio (euro x dólar) mostraram coeficientes expressivos -5.33 e 7.37 por cento, respectivamente. As dummies D6 (sábados) e D7 (domingos) incorporadas no modelo, foram utilizadas para aferir a importância dos fins de semana sobre as visitas e possuem coeficientes próximos a 1 a 1% de probabilidade estatística. Quando retiradas do modelo o R² cai para 0.80% e o teste Ramsey reset apresenta t-statistic de 0.0015. Confirmando que faltam variáveis importantes para o modelo.

Neste século, também conhecido como século da informação, é necessário reter dados e utiliza-los. Os espaços sagrados enquanto local de culto muitas vezes não tem essa preocupação, porém quanto mais rápido as religiões tomarem conhecimento da riqueza das informações, quanto logo poderão se adequar para continuar fornecendo serviços religiosos com mais e maior aproveitamento, além de colaborarem para o meio onde estão inseridas. Diversas iniciativas do setor público e privado podem se beneficiar da melhor gestão desta informação.

O turismo religioso mariano não almeja capturar os turistas de outros grandes centros turísticos do país. O que se coloca em debate é a possibilidade que os centros religiosos possam trabalhar em conjunto com agentes públicos e privados, para a transferência de conhecimento. O que pode gerar melhorias na capacidade de receber visitantes, gerando também benefícios para a economia local.

Bento (2016) mostra diversos estudos onde Portugal foi integrado e os resultados sugerem que o turismo gera crescimento econômico em Portugal, nossos resultados indicam que as peregrinações dependem do crescimento econômico, assumindo assim a hipótese de conservação do TLGH. Corroborando ainda para que mais medidas de colaboração sejam desenvolvidas.

Os resultados mostraram também que não há relação estatística das datas comemorativas (feriados) nacionais e religiosas, mas isso não significa que não exista importância dos feriados e as visitas. Em 2015 o número de feriados nacionais mantinha-se reduzido em Portugal por motivo da crise econômica. Mas, a limitação dos dados não permitiu uma comparação com outros anos. Mais uma vez vê-se o gap a ser trabalhado pelos Santuários, reter de informações para que outros agentes possam colaborar com estudos empíricos e medidas públicas.

Kurmanaliyeva et al. (2014) e Rossini et al. (2016) salientam que o potencial turístico não é usado de forma completa e mostram que há espaço para adequação. A diversificação do turismo nas duas cidades pode colaborar para o aumento do número de peregrinos e visitantes nos períodos de baixa procura, indo de encontro a literatura (Aulet et al., 2017).

O crescimento estratégico da região com base na subdiversificação do tipo de turismo, poderá vir a ser outra importante medida, que colaborará para uma estabilização no número de peregrinos que visitam os Santuários. No caso brasileiro já se fala na materialização de um *cluster* religioso entre as cidades de Aparecida, Guaratinguetá e Cachoeira Paulista. Ressalta-se que, quando se indica a subdiversificação, esta não faz o papel de substituição do fator principal que motiva o deslocamento de um turista, mas acrescenta à causa principal produtos e/ou serviços de interesse específico deste público.

O Santuário de Fátima juntamente com as congregações religiosas da região possuem espaço físico e o *know-how* necessário para explorar melhor o turismo espiritual, que pode ser definido como uma forma de subdiversificação do turismo religioso ou até mesmo como complemento deste.

Sabe-se ainda que apenas 16% da população mundial se diz não afiliada a nenhuma religião (Pew Research Center, 2017), logo, as lideranças religiosas possuem um importante papel na conscientização dos efeitos da degradação ambiental. O que se deseja expressar, é que as religiões podem e devem colaborar para a necessidade atual de zelar pelo meio ambiente, dado que o ambiente também impacta a religião.

Em suma em alguns países e regiões, o turismo religioso exerce papel fundamental quanto ao desenvolvimento e sustentabilidade econômica local. O crescimento dos cristãos e dos fiéis católicos, possivelmente fará crescer o número de peregrinos futuros aos Santuários marianos, mesmo sem a existência de novos fatos místicos.

Abstract

By centuries pilgrimages are present in Christianity. For Catholics, the importance of devotions and visits to the Marian sanctuaries is indisputable. The number of visitors and pilgrims to these temples makes the local economy an important destination for religious tourism. In order to understand the economic determinants of religious tourism, two sanctuaries were studied, namely, Aparecida (Brazil) and Fatima (Portugal). Given the large collection of statistical information of the Portuguese Sanctuary, it was verified through the Vector Autoregressive model that Gross Domestic Product and Unemployment cause unidirectional the pilgrimages. The Autoregressive Distributed Lag model revealed that the increase in Gross Domestic Product and international arrivals in the short term positively impacts the number of pilgrims. Through the Ordinary Least Squares regression, significant statistical relationships between climatic factors (rain volume and average temperature) and visitors in the Sanctuary of Fatima were found. The Seasonal Autoregressive Integrated Moving Average forecast method was applied to the number of monthly visitors to the Sanctuary of Aparecida and to the number of pilgrims in the Sanctuary of Fatima, the results show a strong seasonality and that the first and last months of the year are periods of low demand. The results of this study allow a new look at religious tourism in the Marian context, the empirical results allow those responsible for establishing public policies, tourism agents and the administration of the Sanctuaries to direct yours actions. Measures planned and executed jointly between the various agents can benefit residents, visitors, pilgrims, the tourism sector and the Sanctuaries themselves.

Keywords: Pilgrimages; Marian Sanctuaries; Religious Tourism; Economy and Tourism; Public Policies.

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Acronym list

ARDL - Autoregressive Distributed Lag
ARIMA - Autoregressive Integrated Moving Average
DW - Durbin-Watson
ECM - Error Correction Mechanism
INE - Instituto Nacional de Estatística
ISIS - Islamic State of Iraq and Syria
N. Sr^a - Nossa Senhora
OLS - Ordinary Least Squares
ONU - Organização das Nações Unidas
RDI - Religious Diversity Index
SARIMA - Sazonal Autoregressive Integrated Moving Average
SESDI - Serviço de Estudos e Difusão
SEPE - Serviço de Peregrinos do Santuário
SEPRAM - Serviço de Promoção e Preservação do Ambiente
TLGH - Tourism-Led Growth Hypothesis
VIF - Variance Inflation Factors
VAR - Vector Autoregressive
WISPI - World Internal Security and Police Index
UNWTO - World Tourism Organization
WTTC - World Travel and Tourism Council

1. Introduction

The first Marian apparition that has been reported will have occurred, according to Christian tradition, around the first century in Spain. There are reports of more than two thousand appearances, however, but only 16 recognized by the Vatican. In the world, among the largest sanctuaries dedicated to the Marian cult are Aparecida (in Brazil) and Fatima (in Portugal).

According to Jelly (1998) the famous expression "Mary Mother of God" appears for the first time in Christian literature in the writings of Origen of Alexandria (3rd century), but only in 431 AD Mary was solemnly proclaimed *Theotokos* (Mother of God) by the Council of Ephesus (Jelly, 1998).

The "Marian apparitions" around the world have for centuries made people, mostly believers, move to contemplate this phenomenon or to be in the same place where they occurred. Pilgrimages - as these religious-tourist visits are called - move thousands of people every year and make a significant contribution to the development of the local economy.

Pilgrimage is commonly understood as praying with one's feet. In fact, the long distances are traveled, often on foot. Making use of the writings of St. John of the Cross, it means the mortification of the body, a simple practice for Christians, a "mild discomfort" that is optional and very traditional in the Church. The idea of mortification is to die for the desires of the flesh and live for the love of God. In fact, self-criticism is often seen as a variant of worldly asceticism (Aran et al., 2008; Neves, 1992; Sciadini, 1991).

The Marian pilgrims are inserted in the diverse economies around the world and move for reasons of festivity or religious precepts. The willingness to wander in the direction of a Sanctuary directly impacts the local economy and often impacts an entire region near the Sanctuary.

Object of the investigation

Visitors and pilgrims to the Marian Sanctuaries of Fatima (Portugal) and Aparecida (Brazil) are the objects of this investigation. The historical connection of colony and colonizer, cultural, linguistic and religious approach, allow for several comparisons between the Sanctuaries of the two nations. The dimension (physical and intangible) of the temples made them world references. That is why an expressive number of pilgrims set out every year. During displacement people interact with the local economy, demanding a series of products and services, public and private.

The Brazilian Sanctuary, through its Press Service, provided monthly data for the period from 2012 to 2017. While the Portuguese Sanctuary, through its Study and Diffusion Service, provided the number of pilgrims for two of the time series (annual data of 1994 to 2017 and monthly data from 2008 to 2017) and the number of visitors for the year 2015 (data from 01/01/2015 to 12/31/2015).

Justification

According to data from the Vatican Secretary of State (2016), the number of Catholic Christians grew at the last official church count. The data, based on the number of baptized in all dioceses around the world, increased from 1115 million to 1254 million between 2005 and 2013. The growth occurs over all the years observed. Data from the Pew Research Center (2015) show that the number of Christians as of 2010 was 31.4% of the world's population and that Roman Catholic Church grew at a rate higher than the world's population.

Portugal and Brazil find in tourism an important source of income. And the potential of religious tourism should not be ignored. Therefore, understanding the economic impact of pilgrimages is vital for the development and growth of the tourism sector and religious tourism itself. Likewise, understanding what motivates the pilgrimage from the economic point of view can bring opportunities for improvement in services and products of the agents involved with religious tourism. The elaboration of empirical scientific knowledge can favor the debate about the need for adaptation, improvement and joint work of researchers, State, Church and private agents.

General and specific objectives

Some economies depend directly on tourism; in 2016 travel and tourism contributed more than 50% of GDP to the top four countries on the World Travel and Tourism Council list (WTTC, 2016). It is common to find authorities guiding their economies to obtain more tourism revenue (Aydin, 2016). For this reason, the general objective of this dissertation is to empirically collaborate to understand the economic determinants of Marian religious tourism (or Marian pilgrimages) in Portugal and to elucidate the relation "economy and pilgrimages".

The specific objectives are: (i) to present the empirical results of the relation of the economic variables with the Marian Pilgrimages of Fatima (through models four econometric models, namely: Vector Autoregressive (VAR), autoregressive distributed lag (ARDL), Seasonal Autoregressive Integrated Moving Average (SARIMA), and Ordinary Least Squares (OLS); (ii) Assessing the relationship between climate and

visits to the Sanctuary of Fatima; and (iii) predicting the future number of pilgrims to the Sanctuaries of Aparecida and Fatima.

Hypotheses

It is believed that religious tourism - Catholic Marian - positively impacts several economies and is related to different economic variables. Therefore, hypotheses have been established that seek to collaborate to achieve the objectives proposed in this dissertation, they are:

- a) From the hypotheses of tourism led growth there is a causal relationship between the pilgrimages to the Sanctuary of Fatima and the Portuguese GDP.
- b) there is a causal relationship between the welfare variable (unemployment)¹ and pilgrimages;
- c) The welfare and tourism variables positively impact the pilgrimages in the short and long term;
- d) Climatic factors influence the number of visits to the Sanctuary of Fatima;
- e) There is seasonality in Marian religious tourism.

Structure of dissertation

After the introduction, the five remaining chapters of this dissertation are organized as follows: the second section reviews the existing literature on tourism and economy, drivers of tourism, religious tourism, the problematic of pilgrimages and Catholic religious' tourism Marian. Chapter three describes the methods and the reasons for using them, and the fourth chapter will present the data and empirical results. The fifth chapter will present the discussions based on the results obtained and the theoretical justification. Finally, in the sixth chapter the conclusions are presented, weaving some management and policy measures.

¹ As is commonly known, faith can be a way of overcoming situations of fragility. Therefore, the unemployment variable was used as a proxy for welfare.

2. Literature review

This chapter will present the theoretical link on Tourism and Economy, drivers of tourism, religious tourism and the issues of pilgrimages. Catholic religious' tourism and the phenomenon of Marian pilgrimages will also be addressed. Finally, the impacts of pilgrimages and existing public policies/measures will be explored.

Tourism has become a very important opportunity for any government (Aydin, 2016). It is a source of income for resident families and destination companies (Incera & Fernández, 2015). In some cases, the tourist attraction can generate negative externalities, a fact that corroborates with Benavides (2015) that affirms that tourism does not always generate benefits for the destination.

Travels for religious purposes are understood as one more agent responsible for moving the local economy (Aulet et al., 2017). The concept of tourism is generally linked to development and encompasses a growing number of new destinations (World Tourism Barometer, 2016).

In the world in 2017, international tourist arrivals grew 7%, reaching more than 1,322 million and there is still a good expectation of growth for the year 2018 (UNWTO, 2018). High tourism revenue can become a major budgetary factor and substitute other branches of economic activity (Kurmanaliyeva et al., 2014).

The destinations seek intelligent specialization, that is, the adoption of a strategy to support socioeconomic development based on the identification of regional vocational areas and industries and the promotion of local business development (Del Vecchio & Passiante, 2017).

2.1 Tourism and the economy

The growing interest in Tourism and Growth directed Brida et al. (2016) to make an exhaustive bibliographical review, where with some exceptions, the results suggest that global international tourism drives economic growth.

The relationship between tourism and economy is supported by the contribution to the growth of regional economies (Incera & Fernández, 2015). Balaguer & Cantavella-Jordá (2002), were the first to test the hypothesis of economic growth led by tourism (TLGH), the results pointed tourism as a factor of growth of Spanish GDP in the long term.

Currently, several researchers seek to understand the effects of tourism on the economy (Croes et al., 2018; Chulaphan & Barahona, 2017; Pérez-Rodríguez et al., 2015). There are four hypotheses of the relationship between economic growth led by tourism: (i) growth; (ii) conservation; (iii) feedback; and (iv) neutrality.

Growth

The hypothesis of growth indicates that, through the development of tourism, there is economic growth, in other words, investment in the tourism sector will lead to an increase in overall economic growth. Evidences that point to the hypothesis are found in the studies of Shahzad et. al. (2017); Tang & Tan (2015); Tugcu (2014); Cortes-Jimenez & Pulina (2010); Gunduz & Hatemi-J (2005); Dritsakis (2004); and Balaguer & Cantavella-Jordá (2002).

Conservation

In the hypothesis of conservation, it is observed that economic growth leads to the development of tourism. Investment in other sectors of the economy generates positive externalities, one of which is the development of the tourism sector. Corroborating evidence is found, among others, in studies by Aslan (2014), Payne & Mervar (2010), and Oh (2005).

Feedback

The feedback hypothesis says that economic growth and tourism development are interdependent. They can serve as complementary, that is, investment in other sectors of the economy leads to the development of tourism and investment in the tourism sector leads to increased economic growth. Several authors in the literature have found this hypothesis (Perles-Ribes et al., 2017; Al-mulali, et al., 2014; Lee & Chang, 2008; Demiröz & Ongan, 2005).

Neutrality

Neutrality, this hypothesis suggests there is no casual relationship between the development of tourism and the increase of economic growth. It points out that tourism policies and investments have little or no effect on increasing overall economic growth. It also stresses that investment in other sectors of the economy does not significantly increase tourism. Some researchers are matched with this hypothesis Tugcu (2014); Aslan (2014); and Katircioglu (2009).

In the literature one can find a large number of studies that address the relationship between tourism and economic growth for several countries around the world. In Table A1, there are details of the several methodologies applied to the study of TLGH hypothesis.

Time is an important factor for the relationship between economic growth and tourism, Antonakakis et al. (2015) show that their relationship is unstable over

time. The possibility of changing the direction of the growth relationship establishes the premise of what, researchers should insist on new studies and the application of new methodologies to verify the hypotheses of TLGH.

2.2 Drivers of tourism

What does motivate the choice of a tourist destination? A number of psychological factors are behind this answer, but it would be very simplistic to indicate that only psychological factors influence a person, other economic issues should be weighed and if possible tested in the light of scientific knowledge. In this subsection we will develop the presentation and characterization of some of the main drivers of tourism.

Income

The relationship between income and tourism appears several times in the literature (e.g. Yang & Wong, 2013; Alegre et al., 2013; Eugenio-Martin & Campos-Soria, 2011; Song & Li, 2008; Kulendran & Divisekera, 2007). The higher the prices of goods and services, the lower the demand, so the classic theory of demand is described. The purchasing power of the consumer is one of the determinants in the decision to consume whether it is a tourist service or not.

Alegre et al. (2013) shows the loss of income due to family unemployment also affects participation in tourism. This is why phenomena such as the global economic crisis (Subprime Mortgage Crisis) have significantly affected international tourism (World Tourism Organization and International Labor Organization, 2013). Yang & Wong (2013) argue that adding propensity to travel and a high level of disposable income, domestic tourism can be benefited.

An important question regarding tourism spending was discussed by Dolnicar et al. (2008): What determines it and how can people be influenced to spend more? For Alegre et al. (2013) points out that the tourist's current income has an explanatory capacity regarding the determinants of their participation in tourism and the level of tourist spending.

In tourism, the important thing is not always the number of tourists, but mainly how much they spend with the consumption of products and services. External capital is what generates the growth movement in destiny.

Safety

There are factors external to an economy that modulate the success of the tourist destination. The impact of terrorism varies according to the political regime,

income and intensity of tourism (Liu & Pratt, 2017). Tourists are very concerned about their personal safety (Liu & Pratt, 2017). Since the emergence of the ISIS (Islamic State of Iraq and Syria) terrorist group has created tension and terror in Syria and Iraq (Khan & Estrada, 2016), as well as fear and insecurity around the world (Liu & Pratt, 2017).

Security issues contribute to the destination image and attract international visitors (Andrades & Dimanche, 2017). The Global Peace Index (2017) points to a more peaceful world in the last year, but in the last decade the world is significantly less peaceful. Portugal occupies the third position in the list while the Portuguese-speaking giant (Brazil) occupies the hundredth position (Global Peace Index, 2017).

Globalization allows countries and organizations to open competition in various fields of development and progress, the need to measure the security of countries by international institutions such as the UN, have led researchers to develop the WISPI (World Internal Security and Police Index) (Abdelmottlep (2016).

Abdelmottlep (2016) indicates Portugal as the twenty-first safest country in the world (with 0.781 points), and Brazil is in the ninety-fifth position (with 0.479 points). The ranking is led by Singapore, Finland and Denmark (1st, 2nd and 3rd respectively) and points Africans (Kenya, Republic of Congo and Nigeria) as less secure countries (Abdelmottlep (2016).

Li et al. (2017) points out that economic growth has been negatively affected by outbreaks of disease, terrorist attacks and critical events (eg, the Iraq War). As far as literature is concerned with safety, Buckley & Klemm (1993) stress that fear and insecurity are the main barriers to international travel. It is easily found in the literature that tourists avoid places where terrorist attacks occurred (Liu & Pratt, 2017; Araña & León, 2008).

Exchange rate

Exchange rate that occasionally add to international travels, easily becomes a obstacle. Several factors can move the exchange rate, the most common are monetary policies, economic shocks, social instability and so on.

Li et al. (2017), states that relationship of exchange rate between source and destination currency usually affects the cost of tourist to destiny. As the effective exchange rate is one of the factors that considerably moderates the final impact that tourism has on the global economy of a territory (Andrades & Dimanche, 2017).

The most diverse economic fields are susceptible to international trade. The foreign exchange market affects the decision-making process of individuals and companies. There is evidence that the volatility of the exchange rate affects the

arrivals (example: Agiomirgianakis et al., 2015) and departures (example: Yap, 2013). The impacts of exchange rate volatility can be seen in the short and long term (Bahmani-Oskooee & Gelan, 2018).

For De Vita & Kyaw (2013), exchange rates are also significant determinants of tourism demand. The existence of a common currency has a positive impact on the volume of tourists, other combinations (such as the floating exchange rate between countries, or when only one keeps it fixed) have shown little discernment in their consequences (De Vita, 2014).

Juric et al. (2002) have argued that the perception of how destiny is "expensive" in behavioral terms is determined by the process of mental conversion that occurs on the part of tourists. To see empirical evidence that financial decisions of tourists are made from conversions Raghubir et al. (2011).

Climatic factors

The interaction of tourism and climate are studied by several contemporary researchers (Toth et al., 2018; Falk & Lin, 2018; Wijaya & Furqan, 2018; Craig & Feng, 2018; Weir, 2017). According to Wijaya & Furqan (2018) the tourism sector depends on the climate. But tourism itself can contribute to intensifying climate change due to increased greenhouse gas emissions (Machete, 2011).

It is also known that climatic factors affect behavior, Fikru & Gautier (2015) show that households consume more energy during the winter; Wagner et al. (2016) argue that adverse conditions discourage physical exercise. Similarly, the perception of a "bad weather" can also influence going to church or carrying out a pilgrimage. Marcum (1999) points to the climate as one of the twelve circumstances by which Presbyterians failed to attend religious service. The pattern is repeated in a study conducted by Olson (2008) where in Protestant churches, severe winter decreased the number of present on three Sundays between January and February.

In Christianity, in the twelfth century, an important defender of nature arose, Francis of Assisi. In Brazil, since 2004, Catholic authorizations have brought the environmental issue to the fore, through the campaigns of the fraternity. This reflection was reinforced and expanded further after Pope Francis published the letter enunciated *Laudato Si'*, where memory of various requests of the Church is made to pay more attention to the environmental issue and launches an important call: "to protect our common home" (Francisco, 2015).

Climate change is a global concern, many researchers approach this in their research (Clifford & Travis, 2018; Craig & Feng, 2018; Shahbaz et al., 2016). Dube & Nhamo (2018) suggest that climate change and variability pose a real threat to the

tourism industry and other economic sectors. This corroborates with Machete (2011) who points to tourism as an economic sector that anticipates that climate change will have a great impact.

Image and Publicity

From Hunt (1975) it is noticed the importance of investments by the tourist destination to develop its image, the investment causes in the tourist the desire to travel. The media plays an important role in the construction and maintenance of the image of tourist destinations (Cristea et al., 2015).

Tourism is hampered when there is no information. Rathore et al. (2017) indicates the importance of social media in the tourism industry, a corroborating fact with Andrades & Dimanche (2017) that affirm that there are destinations with great potential, but they continue to be harmed by several issues, including the image of destiny.

In religious tourism it is no different, Štefko (2015) points out several shortcomings as barriers to the development of pilgrimages and religious tourism, among them marketing communication.

The media should be recognized for its important role in the construction, promotion and maintenance of the image of tourist destinations worldwide, but poor media coverage no longer contribute to the tourism-religious offer Cristea et al. (2015). It is notorious that large Marian sanctuaries around the world have a specific sector for press and media issues such as the case of Aparecida and Fatima.

A corroborating study by Rathore et al. (2017) also indicates that the importance of text information (Wikipedia) and video content (YouTube) is increasing in the field of online tourism and indicates that the tourism department needs to focus on such content.

There are several drivers of tourism and these usually affect all types of tourism. A schematic summarizing the main drivers of religious tourism can be seen in figure 1

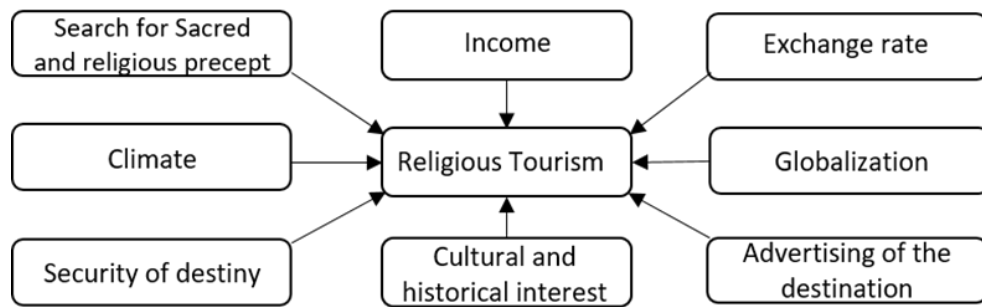


Figure 1 - Drivers of religious tourism

The outline describes this subsection in summary, however, goes beyond and brings to the reader other aspects relevant to the motivation of this form of tourism. The other drivers are presented at a more opportune moment in this dissertation, in order to clarify the reason for its importance.

2.3 Religious tourism: visits to sacred sites

Since from Weber there is an understanding that the economic prosperity of some regions was attributed due to the Protestant religion. Becker & Woessmann (2009) collaborate in the debate by providing an alternative theory, where human capital is crucial to economic prosperity, that is, relate economic prosperity and better education to Protestants.

Religion can be considered a powerful instrument of social interaction. Lim & Putnan (2010) argue that the higher satisfaction observed among religious people can be explained, above all, by the level of attachment that occurs in religious services. Van Ingen & Moor (2015) point out that the frequency in religious services has been in marked decline in the West. However, there is a specific variation per country (the fall is evident in Belgium, the United States remains stable and there are cases of trend reversal, such as Romania).

Since the frequency of religious rites is an obvious measure of the level of religiosity in a given territory, it is natural that the individuals who practice it become more integrated in terms of community. Lewis et al. (2013) show that this effect reinforces the emergence of support and protection networks.

Throughout the world there are hundreds of sanctuaries and temples, sacred sites, where believers (and not believers) of the most diverse faiths visit them, seek (or not) their encounter with the sacred. Most places of worship are unknown worldwide. However, there are several temples and "famous" sanctuaries and

temples², which are known among practitioners of religion and a substantial part of the world's population.

For hundreds of years the trips by religious foundation are present in the history of the humanity. It is from the land of the Pharaohs that the great pilgrimage of the Hebrew people will take place (Pontifical Council for the Pastoral Care of Migrants and Itinerant People, 1998). This exodus took place around 1250 BC (Holy Bible, 1990, p. 65) when the people wandered in search of the land promised by their God Yahweh. The same God who previously indicated to Abram and his family to leave their land, is possibly the first pilgrimage motivated by faith, which has been reported (Bible of Jerusalem, 2013, p. 49).

Still in historical context, during the reign of Solomon the First Temple was built, in Jerusalem in the Middle East, this one receives thousands of pilgrims every year to celebrate the feast of the liberation (Pesach). The search for the atonement of sins and the presentation of the firstborn male were other religious precepts that justified trips to Jerusalem in the past. Centuries later, after the Arab conquest of Jerusalem in AD 638, the encounter with the Christian memories of the Holy Land becomes more arduous, and new itineraries of pilgrimage are opened in the West.

Rinschede (1992), defines the mobility of religious tourism as exclusively or strongly motivated by religious reasons. This definition is in agreement with Alvarado-Sizzo et al. (2017), who claim that faith is a strong reason to travel.

For centuries cities have been concerned with urban planning. The sacred sites owe their urban and economic development to the growth of tourism and the arrival of pilgrims (Alvarado-Sizzo et al., 2017). In the past in Jerusalem, a month before Pesach, their roads were reformed and the artesian wells restored, in order to guarantee the maximum comfort of the pilgrims.

The search for understanding religious tourism is a guideline for many contemporary researchers according to table 1

² Al-Haram Mosque, Saudi Arabia; Sanctuary of Our Lady of Lourdes, France; Meiji Shrine and Sensoji Temple, Japan; Sanctuary of Our Lady of Fatima, Portugal; Temple of Solomon, Brazil; Kashi Vishwanath Temple, India; Basilica of Our Lady of Guadalupe, Mexico; Angkor Wat Temple, Cambodia; Basilica of St. Peter, Vatican; Cathedral Basilica of Our Lady Aparecida, Brazil.

Table 1 - Current literature on religious tourism

Authors	Keywords	Highlights
Husein (2018)	Foot-pilgrimage; Islamic pilgrimage; Pilgrim motivation; Pilgrim experience; Rituals and pilgrimage; Phenomenological study.	A phenomenological study of the pilgrimage to Arba'een (Iraq). It also stresses the importance of studies on non-Western pilgrimages.
Alvarado-Sizzo et al. (2017).	Religious tourism; Regional scopes; Pilgrimages; Marian celebrations; Our Lady of Izamal-Yucatan; Izamal	The current devotion to the shrine of Our Lady of Izamal is a continuation of the Mayan tradition. Most visitors are moved for religious reasons. Pilgrimage and visits to shrines are a way of strengthening local identity.
Aulet et al. (2017).	Monasteries; Landscape; Tourism; Gastronomy; Religious tourism.	Monasteries attract religious tourists, but tailoring the types of tourism can bring sustainability to the regional economy. With the implementation of appropriate measures can result in more income. The region of the monasteries, can go from religious tourism, to spiritual and gastronomic tourism.
Hung et al. (2017).	Shaolin Monastery; kung fu; culture; commercialization; sanctity; religion;	The commercialization of sacred places may contradict the values and philosophies of Buddhism. The study aims to comprehensively understand the balance between marketing and holiness. Based on the results of the study, a balanced model of religious tourism development is suggested.
Moaven et al. (2017)	Cultural Globalization; Religious Tourism; The awareness of globalization; Individualism; Quantitative Method; The Holy Shrine of Shah-e Cheragh.	Through a quantitative questionnaire we sought to examine the relationship between cultural globalization and religious tourism. The results indicate that information and communication technology and individualism maintain a strongly negative relationship with religious tourism, while awareness against globalization does not reveal a relationship with religious tourism.
Chadha & Onkar (2016).	Challenges; City; Religious Tourism; Urban Planning.	The tourism industry in this decade has brought many changes to Indian cities, diversified social and cultural identity and generated opportunities for economic development. Cities with tourism potential are facing urban planning problems. The decade's need for urban planners and designers is to be prepared for the changes in a tourist city.
Nyaupane (2015).	Social distance; Pilgrimage; Lumbini; Buddhists; Religious motives; Heritage tourism; Communitas;	Relationships between people of different religions who visit the sacred sites of others are complex. Social distance is useful to explain why people of different religions visit the sacred sites of others. Four motivational domains of tourists visiting a Buddhist site are identified. Tourist-pilgrim is explained by adding a cultural / societal dimension in how the terms are defined.
Cristea et al. (2015).	religious tourism; religious marketing; media; identity; construction;	The media plays an important role in building and maintaining the image of tourist destinations. Objective of this study was to analyze the market of religious tourism in Northern Moldova and investigate the media discourse and how it supports the marketing approach.
Olsen (2014).	religious tourism; segmentation; scale; expectation of experience;	Academic studies on segmentation of the tourism market have declined in scale over time. The results show that there are differences in motivation and "expectation of experience" of people traveling to religious sites versus religious lines and religious areas.
Černá (2014).	Religiousness; religious tourism; Slovakia; pilgrim's journey; localizations factors;	Pilgrimage tourism is being determined by trends, with Slovakia - a country perceived as strongly Christian. The purpose of this case study is to constitute a typology of historical landmarks and attractions related to the specificities and development of the Slovak territory.

Various ancillary conditions allow cultural development: technical progress, the reduction of legal restrictions, greater notion of globality. Braga et al. (2014) defined and named different forms of cultural tourism and describes religious tourism with active and passive characteristics. Agreeing with Černá (2014) religious tourism represents an important segment of cultural tourism, this type of tourist also visits Fatima and other spaces of pilgrimages.

Kurmanaliyeva et al. (2014) alludes to religious tourism as possessing a kind of socio-cultural potential to influence people's motivational state. The importance that a place of worship has in front of the local economy can vary according to the creed. Assertive public policies collaborate for the maintenance and economic development of tourist-religious destinations. The substantial increase in tourism in recent years justifies academic research on the subject and agrees with Moaven et al. (2017) which states that religious tourism is a large part of the globalization process.

2.4 Issues of pilgrimages

The most important phenomenon of the individual's social life is the understanding of the sacred and moral (Durkheim, 1912). People in turn need cultural and religious objects for spiritually ideological existence (Kurmanaliyeva et al., 2014).

Durkheim (1912) also reflects the importance of the religious practice and works the collective effervescence, that is, to meet in faith. The terrestrial life understood as a pilgrimage. By according to the Catechism of the Catholic Church (1993) the definition of Church designates the people whom God calls and gathers from all ends of the earth.

Pilgrimage is a phenomenon that is present in various creeds. The most popular religions include it in their practice (Alvarado-Sizzo et al., 2017). The motivation of those who set out to wander, is usually the search for the sacred. Gesler (1996) defines pilgrimages as a journey of transformation. Turner (1969) states that pilgrimage is often done in a group as a matter of mobility, but it is individual in the search for the encounter with the sacred.

For Bauman (1998), devotion distinguishes the pilgrim from the tourist, the pilgrims have some characteristics: (i) they follow deep values; (ii) are tilted inwardly; (iii) build a memorial of the pilgrimage; and (iv) reflect during it. The tourist, in turn, turns away from him, is related to what is external, novelties, adventures, fleeting sensations, curiosities and pleasures (Bauman, 1998).

Becoming a pilgrim is a genuine profession of faith (Francisco, 2017). For Cardita (2012) there is a need to participate in a pilgrimage to understand the phenomenon and study it. Pilgrimage is also to leave the comfort zone itself and through the mortification of the body to seek spiritual well-being, this can be obtained even with physical wear.

Pilgrimages in Catholicism

Higgins and Hamilton (2016) defined Lourdes (France), being a place of divine intervention where transformations are attributed to factors beyond the individual, or else, place of intentional activity of a supernatural being (Basinger, 2011). The Pope stated that "Popular piety [...] finds in the sanctuary a privileged place where it can express the beautiful tradition of prayer, devotion and dedication to the mercy of God inculcated in the life of each people" (Francisco, 2017).

Understanding these phenomena requires more than a superficial view of physical events. To question oneself as to the reason for things is a natural property of the reason of man, although the answers are integrated in a horizon that shows the complementarity of the different cultures where man lives (João Paulo II, 1998).

From the first centuries the Christian pilgrimage was especially conceived of the places where Jesus Christ had lived, the mystery of the love of the Father announced, and above all where a tangible sign of his resurrection was found, for example the empty tomb in Jerusalem). Then the pilgrims set out on their way to the places where, according to the various traditions, the tombs of the Apostles were found (Francisco, 2017).

Sanctuary of Fatima (Portugal)

The three children (Lúcia dos Santos and her brothers Francisco and Jacinta Marto) are a fundamental part of the Fatima phenomenon. Cristino (2011) describes that after the boys had undefined visions of an angel and the apparitions of the angel of peace of Portugal, the first Marian apparition occurred at Fatima. That 13th (second Sunday) of May 1917 marks the beginning of yet another great Catholic Christian devotion in the world. The developed Marian iconographic model becomes one of the most publicized of the contemporary era (Duarte, 2010).

Since the first chapel, built in 1919, the Sanctuary of Fatima, has undergone various works and constructions. It currently has the Basilica of Our Lady of the Rosary of Fatima, the Chapel of the Apparitions and the Basilica of the Holy Trinity (inaugurated in 2007). The Sanctuary still has other places of pilgrimage: Valinhos (place of the first and third appearance of the Angel); the Well of the backyard of

the House of Lucia (place of the second appearance of the Angel); the Houses of Lucia; the House of Francisco and Jacinta; the parish Church; and the parish cemetery of Fatima.

In its statute the Santuário de Fátima (2006) is a place of pilgrimage, motivated by the supernatural character of the founding event (the apparitions to the Shepherds). An integral part of the mission of the sanctuary is to Message of Fatima³, in Portugal and in the world (Santuário de Fátima, 2006).

In 2017, the year of the celebration of the Centenary of the Apparitions, the Sanctuary received 7110 international pilgrimages, almost three times larger than in the previous year (Santuário de Fátima, 2018), not to mention countless national pilgrimages (statistics of international pilgrimages, graph A1, in appendix). The festivity was marked with the presence of Pope Francis for the canonization of the Saints Francisco and Jacinta Marto and the delivery of the third Rose of Gold⁴ to Our Lady of Fatima.

Still in 2017, the number of visitors to the Sanctuary reached an incredible 9.4 million (Santuário de Fátima, 2018). Portugal in the same year was considered the best tourist destination in the world (World Travel Awards, 2017) and hotel establishments registered 20.6 million guests nationwide (Instituto Nacional de Estatística, 2018).

There is a recent expansion of the literature on the phenomenon of Fatima and the sanctuary (e.g.: Fuinhas et al., 2018; Franco & Reis, 2017; Benatti, 2016; Prazeres & Carvalho, 2015; Duarte, 2010). Santos, (2001) points out that the Sanctuary of Fatima is considered by many to be "the Altar of the World" and possessed of great religious influence. In addition, economic problems (among others) are a reason for pilgrimage to the Sanctuary of Fatima (Fortuna & Ferreira, 1993)

The municipality of Ourém

The municipality (in Portuguese, *concelho*) of Ourém has 416.68 km², is located in the Central Region of Portugal, which is equivalent to 31% of the territory of mainland Portugal and with a population of more than two million people (Instituto Nacional de Estatística, 2011)

³ Congregation for the doctrine of faith, the message of Fatima. http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20000626_message-fatima_po.html.

⁴ Distinction that can be attributed to personalities, sanctuaries, churches or cities, in recognition and reward for services rendered to the Church or for the benefit of society.

The population of the municipality, according to the sense of 2011, is 45.932 residents (Instituto Nacional de Estatística, 2011). Agriculture was the basis of the economy until the beginning of the twentieth century. In the municipality prevailed the minifundio, being the production of wine (red and white), potato and corn the main agricultural products in 1910 (Neves, 2016). Portugal still saw the agricultural sector suffer negative impacts with the implantation of the republic in 1910 and with the end of the first world war (1914-1918). Neves (2016) further states that due to the difficulties of survival and the state political guidelines, Ourém administration implemented food rationing measures.

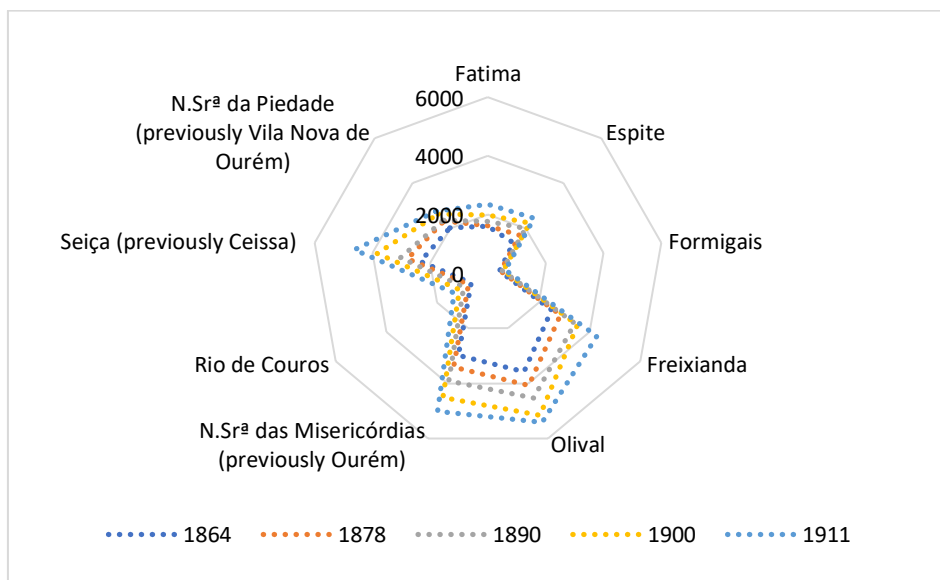
Currently the municipality is divided into thirteen parishes (in Portuguese, *freguesia*), having Fátima received the honorific title of city, due to its spatial dimension, urban development and international projection. In Figure 2, the map of the region.



Figure 2 - Municipality of Ourém
Source: freguesias.pt

Still in the nineteenth century, due to administrative needs, the first recensions of the Portuguese population began. In the first sense (1864), the municipality of Vila Nova de Ourém (name of the time) had nine parishes, namely: Fatima; Espite; Formigais; Freixianda; Olival; N. Sr^a das Misericórdias (previously Ourém); Rio de Couros; Seiça (previously Ceissa); e N. Sr^a da Piedade (previously V. Nova de Ourém). Over the years the number of municipality parishes has doubled.

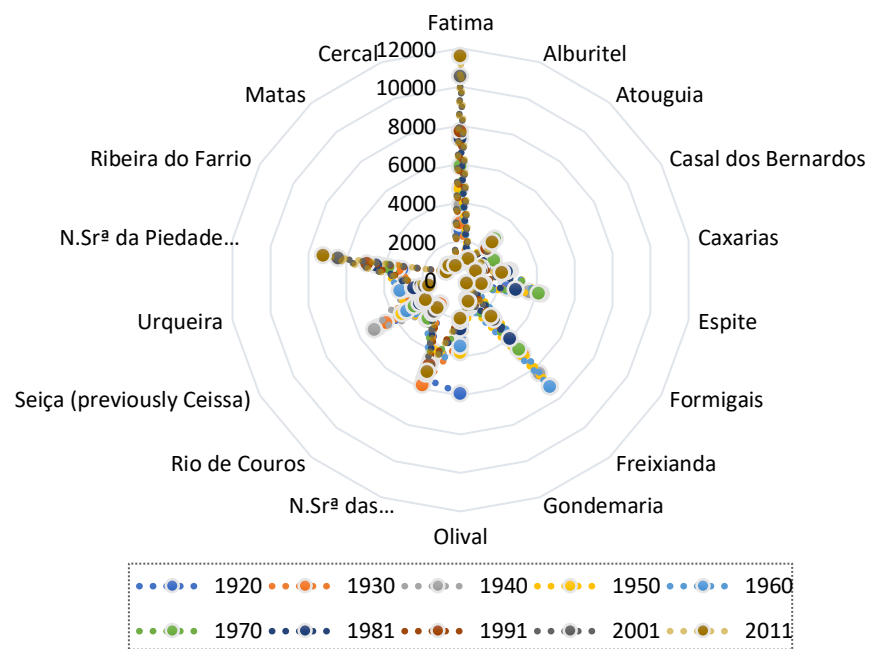
In graph 1, the data for the parishes are recorded until 1911, last population sense before the phenomenon of Apparitions.



Graph 1 - Municipality of Ourém before the Marian phenomenon

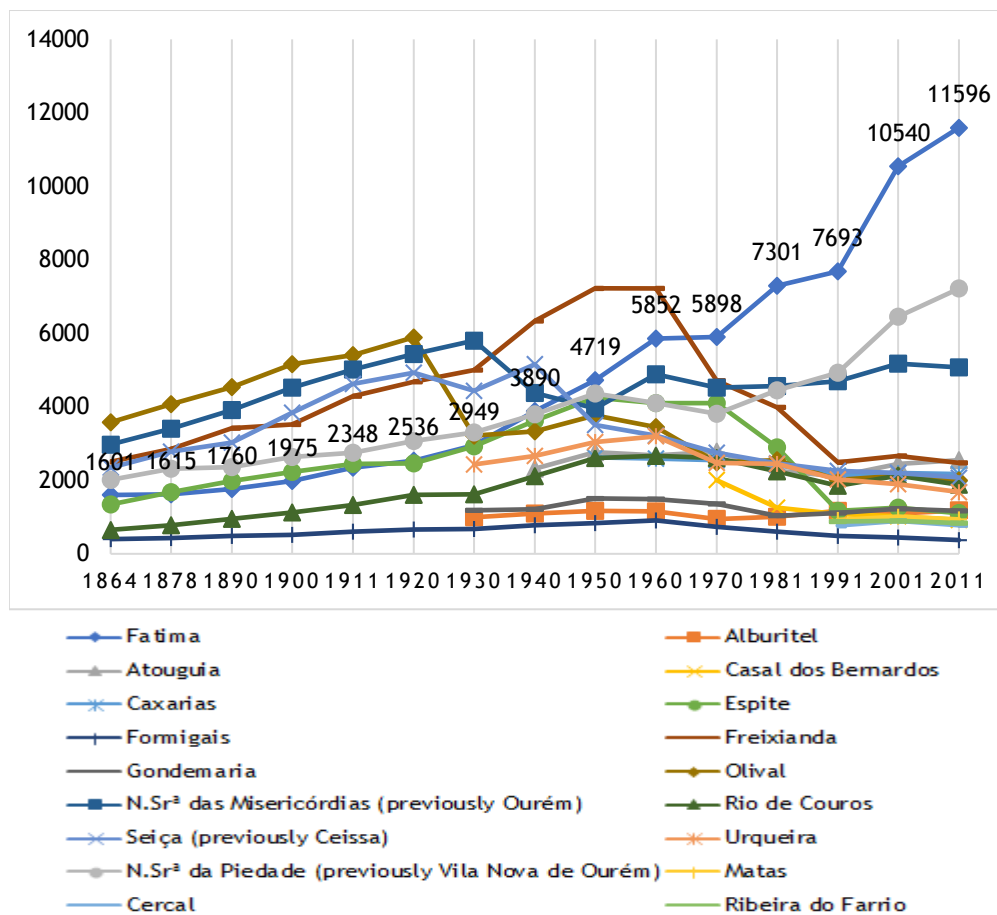
At the end of the nineteenth century and beginning of the twentieth century the great parishes of the municipality in number of people were: Seiça; N. Sr^a das Misericórdias; Olival; and Freixiada. In 1911 each had more than 4000 peoples. From the 1930s, territorial changes began to emerge. Three new parishes (Alburitel, Gondemaria and Urqueira) become part of the municipality. In the course of time new parishes arose Atougua, Caxarias and Casal dos Bernardos, 1940, 1950, and 1970 respectively.

In the sense of 1991 appear the last parishes that composes the municipality: Matas; Cercal and Ribeira do Farrio. In graph 2 we see the population growth of the municipality of Ourém after Marian phenomenon of Fatima.



Graph 2 - Municipality of Ourém after the Marian phenomenon

Graph 3, shows data on the population growth of the 18 present parishes of the municipality of Ourém.



Graph 3 - Population of the municipality of Ourém

In 1970, the city of Fatima appeared for the first time as the largest population of the municipality. It currently has almost double the inhabitants compared to Nossa Senhora da Piedade.

Sanctuary of Aparecida (Brazil)

The history of the Sanctuary of Aparecida began in 1717, when three fishermen, Domingos Garcia, Felipe Pedroso and João Alves, in Porto Itaguaçu (State of São Paulo), fished the body of a statue (broken at the height of the neck and without the head), throwing the net again to the river they caught his head. After joining the two parts it was noticed that it was the image of the Lady of the Conception (National Sanctuary, 2016).

The first oratory opened to the public was built in 1732, where the "Miracle of the Candles" took place, where candles lit up without anyone touching them (Santuário Nacional, 2016). But the first church was only built in 1745, due to the

increase of devotion of the faithful. The "Old Basilica" and/or "Basilica Matrix"⁵ as it is commonly known was only built in 1888 (Santuário Nacional, 2016).

In 1980, the Sanctuary of Our Lady of the Conception Aparecida⁶ was consecrated by Ioannes Paulus PP. II. It is currently the largest Marian Sanctuary in the world, with an area of more than 1.3 million m², with almost 143 thousand m² of constructed area (Santuário Nacional, 2016). The great centre of evangelization received more than 13 million visitors in 2017, the year of the 300th anniversary of the appearance of the image (Santuário Nacional, 2018).

The feast of the Patron of Brazil was celebrated on several dates, but it was determined by the National Conference of Bishops of Brazil that the feast be celebrated on October 12. The reasons presented were: (i) association with the date of discovery of America; (ii) commemoration of the child's day; and (iii) October is the month of the image meeting, in the Paraíba do Sul river, in 1717 (Santuário Nacional, 2016).

The Path of Faith (also known as the Faith Route), inaugurated in 2003, is the main route to pilgrimage to the Sanctuary of Aparecida. There are several points of departure between the State of Minas Gerais and São Paulo for those wishing to take the course that has more than 400 km.

The Sanctuary of Aparecida (like the Sanctuary of Fatima) also received three golden roses (for details on the distinctions, table A2 in appendix). The countries colonized by Portugal follow their religious matrix, that is, Christianity⁷. Brazil is the country with the most Catholics in the world and is among the countries that most send pilgrims to the Sanctuary of Fatima. Data from the Pew Research Center (2014) about religious diversification in Portuguese-speaking countries are presented in table 2.

⁵ In Baroque style, in 1982 it was listed as a monument of historical, religious and architectural interest by the Council for the Defense of Historical, Archaeological, Artistic and Tourist Heritage of the State of São Paulo.

⁶ The name "Aparecida" was adopted by popular devotion and alludes to having "appeared" during fishing.

⁷ Except for Guinea-Bissau, where the Muslims are majority.

Table 2 - Religion of Portuguese-speaking countries

Countries	RDI	Christian	Muslim	Judaic	Popular Religion	Other Religion	No Affiliation
Angola	2	90.50%	0.20%	< 0.1%	4.20%	< 0.1%	5.10%
Brazil	2.3	88.90%	< 0.1%	< 0.1%	2.80%	0.20%	7.90%
Cape Verde	2.3	89.10%	0.10%	< 0.1%	1.50%	0.20%	9.10%
Guinea-Bissau	7.5	19.70%	45.10%	< 0.1%	30.90%	< 0.1%	4.30%
Mozambique	7	56.70%	18.00%	< 0.1%	7.40%	< 0.1%	17.90%
Portugal	1.4	93.80%	0.60%	< 0.1%	0.50%	< 0.1%	4.40%
Sao Tomé and Príncipe	3.5	82.20%	< 0.1%	< 0.1%	2.90%	2.40%	12.60%
Timor-Leste	0.1	99.60%	0.10%	< 0.1%	0.10%	< 0.1%	< 0.1%
Note: RDI stands for Religious Diversity Index							

The most Brazilians and Portuguese people assume themselves as Christians and have a low Index of Religious Diversity.

In the next chapter will be presented the methodology applied in this dissertation, the econometric methods and the data as well as the respective descriptions of the data used.

3. Methodology

In this chapter the econometric models applied in this dissertation will be presented, namely: Vector Autoregressive; Autoregressive Distributed Lag; Seasonal Autoregressive Integrated Moving Average. The data applied to each of the models will be presented in due time due to the diversity of variables and methods.

VAR Model

From the VAR model proposed by Sims (1980) to economic studies, multivariate data analysis in the context of VAR models evolved as a standard instrument in econometrics (Pfaff, 2008). In the economic literature, several authors applied the VAR and its variations (Danish et al., 2018; Koengkan, 2018; Marques & Fuinhas, 2015; Pradhan & Bagchi, 2013; Love & Zicchino, 2006). In figure 3 presents the necessary conditions for VAR estimation:

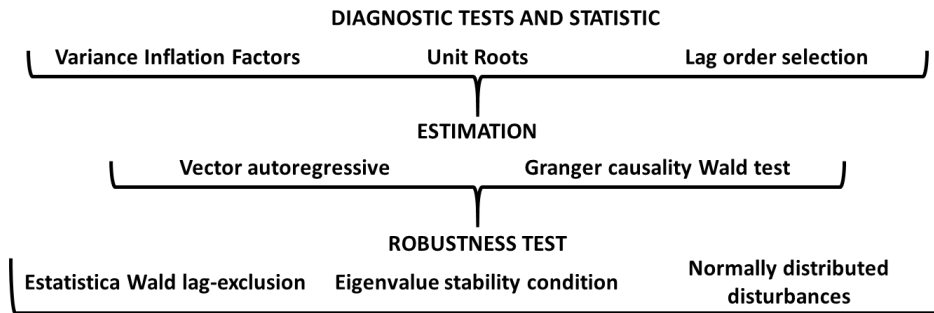


Figure 3: Vector autoregressive

The VIF (Variance Inflation Factors) statistic affects multicollinearity and has a mean limit of 10. The unit roots have as null hypothesis the presence of unit root and as an alternative hypothesis the stationary or stationary tendency. The Lag order Selection determines the ideal number of lags in the VAR estimation. The Granger causality Wald test tests the causal relationship between the variables. The Wald lag-exclusion statistic performs lag exclusion tests, that is, it reveals the number of lag required for the VAR. The Eigenvalue stability condition and the graphical demonstration allow to verify the stability of the estimated model. The test for normally distributed disorders presents three statistics of normality: (i) Jarque-Bera; (ii) Skewness; and (iii) Kurtosis.

In equation 1, we see the VAR model, proper for time series:

$$Y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t \tag{1}$$

where: Y_t are the exogenous variables; A_1 are coefficient matrices ($k \times k$) for $i=1, \dots, p$; and u_t is a vector of white noise.

ARDL model

In the ARDL model, the order of integration of the variables must be $I(0)$ or $I(1)$, in the presence of a variable $I(2)$ the estimation can not be performed (Shahzad et al. 2017; Sek, 2017; Chang & Chen, 2017; Katrakilidis & Trachanas, 2012; Marques et al., 2017). Multicollinearity and collinearity can be a very serious problem, so the VIF statistic and the correlation matrix must be checked before estimation.

The ARDL model is used to decompose the total effect of the variables into the short and long term effects. As a widely used method in the economic literature, in the tourism-economy relationship (Falk & Lin, 2018; Agiomirgianakis et al., 2017; Ohlan, 2017; Liu & Pratt, 2017; Kumar & Stauvermann, 2016; Jalil, 2013; Kibara et al. al., 2012). Equation 2 specifies the ARDL model:

$$\Delta p_t = \text{Consant} + \text{Trend} + \sum_{i=1}^a \beta_i \cdot \Delta p_{t-1} + \sum_{i=0}^a \beta_{i+2} \cdot \Delta w_{t-i} + \beta_{i+3} \cdot p_{t-1} + \sum_{i=0}^a \beta_{i+4} \cdot w_{t-1} + \beta_{i+4} + u_t \quad (2)$$

where, p correspond to the dependent variable; w corresponds to the exogenous variables in the models; β_i and β_{i+3} are the coefficients of the dependent variables; β_{i+2} and β_{i+4} are the coefficients of the explanatory variables; p_{t-i} , p_{t-1} and w_{t-1} correspond to the lags of the dependent variable and explanatory variables; and u_t the error term.

After the estimation of the model, some attention is required: The negative signal of the ECM indicates the explanatory capacity in the long term; The presence of Heteroskedasticity invalidates the results; In the presence of outliers the same must be controlled through the stability or impulse dummies; The statistic and Jarque-Bera indicates the normality of the model.

Model SARIMA

As the Autoregressive Integrated Moving Average (ARIMA) is the most popular in time series prediction affair, this model can adjust to almost all time series data with the desired precision (Haque & Haque, 2017; LiHui & Hayashi, 2014; Chen et al., 2008). The method can be applied to various fields such as business, people,

finances, carbon prices, tourism, natural phenomena among others (Qin et al., 2017; Haque & Haque, 2017; Zheng et al., 2016; Valipour, 2015).

The ARIMA models use the Box-Jenkins methodology developed in 1976, known as the short-term prediction model (Granger & Newbold, 1977). Classic time series prediction methods such as ARIMA can only model linear patterns in time series (Box et al., 2015). ARIMA uses the values of the lags of the series itself, through a temporal correlation (Gujarati & Porter, 2011). Predictions can be obtained through econometric models, technical analysis of graphs and trends, and qualitative and intuitive support (Eiteman et al., 2013).

Cavalcanti Netto (2007) points out that the results of analyzes with these models show that the best prediction results are obtained between 5 and 10 years of monthly information, particularly in the presence of seasonality. If there is a seasonal component in the series. The appropriate model is called SARIMA and can be seen in specification 1.

$$\text{SARIMA } (p, d, q)(P, D, Q)_s \quad (1)$$

where p is the order of the non-seasonal autoregressive model; d is the number of non-seasonal differences; q is the order of non-seasonal moving average model; P is the order of seasonal autoregressive model; Q is the order of seasonal moving average model; D is the number of seasonal differences; and s is the periodic term.

In order to give robustness to the forecast model, some diagnostic tests are necessary: (i) stationary; (ii) heteroskedasticity; and (iii) Ljung-Box test, to verify the existence of white noise. The adequacy of the ARIMA model is generally supported through the use of mean error, absolute mean error, mean square error, or Theil-U statistic (Sato, 2013).

4. Data and empirical results

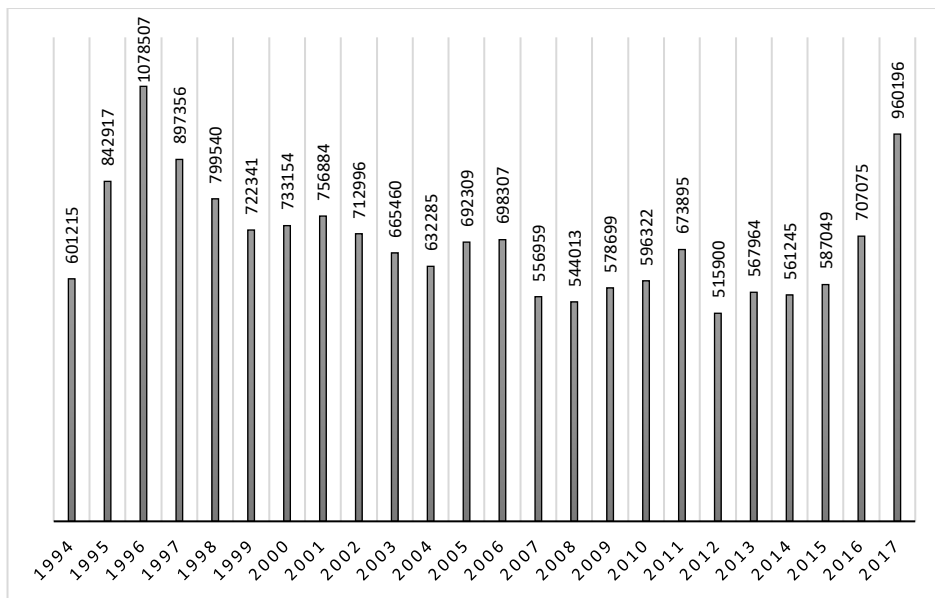
In this chapter will be presented the data of the pilgrimages to the Sanctuary of Our Lady of the Rosary of Fatima and the Sanctuary of Our Lady of the Conception Aparecida, as well as the results of the estimates made.

The number of pilgrims from the Sanctuary is made up of the number of national and foreign pilgrims, members of groups registered with the *Serviço de Peregrinos do Santuário* (SEPE). At the level of the celebrations, the data collection is done through the *Serviço de Promoção e Preservação do Ambiente* (SEPRAM) that based on studies previously made to understand the occupation of the physical spaces perform the collection of data.

Group registrations in SEPE are carried out in cases where the groups intend to hold celebrations in spaces not open permanently to the public or even when they intend to make themselves officially announced as a pilgrimage group. It is possible to access the public spaces of the Sanctuary and take place in the celebrations that take place there, without there being any control by the Sanctuary.

To ensure consistency of information, visitor and pilgrim data were provided directly by the Sanctuary of Our Lady of the Rosary of Fatima through its *Serviço de Estudos e Difusão* (SESDI)⁸ and (Santário de Fátima, 2008). In graph 4, annual data on the number of pilgrims are presented.

⁸ Among the functions attributed to SESDI are promotion of studies, meetings; and scientific publications.



Graph 4 - Pilgrims in the Sanctuary of Fatima

During the period of the economic crisis the number of pilgrims had the worst results. In 2017 for all festivities and the papal visit one notes the second best mark since there are records.

VAR Model

In table 3 presents the variables, acronyms and databases and / or information systems where the data were obtained. The descriptive statistics of the variables are also presented.

Table 3 - Description of the data (VAR)

Variables	Acronym	Source			
Pilgrims	per	SESDI			
GDP (constant LCU)	gdp	WorldBank			
Population total	pop	WorldBank			
Unemployment, total (% of total labor force)	dese	WorldBank			
KOF globalization index	kof	kof swiss economic institute			
Descriptive statistics					
Variables	Obs	Mean	Std. Dev.	Min	Max
lper	22	13.4168	0.1830	13.1537	13.8911
lgdp	22	25.8317	0.0926	25.6004	25.9273
lpop	22	16.1543	0.0186	16.1173	16.1738
Dese	22	8.3223	3.7112	3.8200	16.1800
Kof	22	79.3500	2.5893	73.1237	82.2079

l denotes natural logarithm;

The time horizon is the widest possible, given the availability of data for all variables of the model, comprising information from 1994 to 2015. After confirming the stationary of the series, through the tests ADF (Augmented Dickey-Fuller) and PP

(Phillips Perron), details, table A3 in the appendix. The VIF statistic check was also checked (table A4) and showed to be normal.

In the PP test, to evaluate the null hypothesis of unit root, we used the Bartlett and Newey-West Bandwidth spectral estimation method. The same null hypothesis of unit root was tested in the ADF test and the Schwartz information criterion with a maximum of 16 lags was used. Finally, we selected the lags of the estimation using the Stata varsoc option, with a maximum of 3 lags, table 4.

Table 4 - Lag order selection on estimation

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	94.7016	-	-	-	3.20E-11	-9.96684	-9.93274	-9.71951
1	147.574	105.75	25	0.000	1.70E-12	-13.0638	-12.8592	-11.5798
2	188.958	82.767*	25	0.000	6.40E-13	-14.8842*	-14.5091*	-12.1636*
3	-	-	25	-	-3.2e-60*	-	-	-

The test indicated the number of 2 lags as ideal for estimation. Following the suggestion, the number was applied in the estimation. Following is the result of the Granger causality test that indicates the causal relationship between the variables. We chose to present in table 5 the most parsimonious model, excluding variables with no statistical significance.

Table 5 - Granger causality test results

Equation	Excluded	chi2	df	Prob>chi2	
dlper	dlgdp	15.285	1	0.000	***
	ddese	10.043	1	0.002	***
	ALL	15.694	4	0.003	***
dlgdp	ddese	15.497	1	0.000	***
	dlpop	48.568	1	0.000	***
	dkof	7.8454	1	0.005	***
	ALL	73.437	4	0.000	***
ddese	dlgdp	3.5824	1	0.058	*
	dlpop	37.147	1	0.000	***
	ALL	42.641	4	0.000	***
dlpop	ddese	9.5976	1	0.002	***
	ALL	18.859	4	0.001	***
dkof	dlper	3.5181	1	0.061	*
	dlpop	8.3963	1	0.004	***
	ALL	10.607	4	0.031	**

The model is accepted as exogenous mostly the statistical probability of 1%. In sum, Unemployment and GDP cause pilgrimages to 1% and surprise pilgrimages have unidirectional causal relationship with globalization to 10%. The variable globalization is made up of social and cultural indicators that grew at the same time as more international pilgrims landed in Portugal to visit the Sanctuary, this being one of the justifications for the existence of a statistical relationship between the

variables. Table A5 in the appendix shows the complete results and an illustration of the flow that summarizes the results of the model.

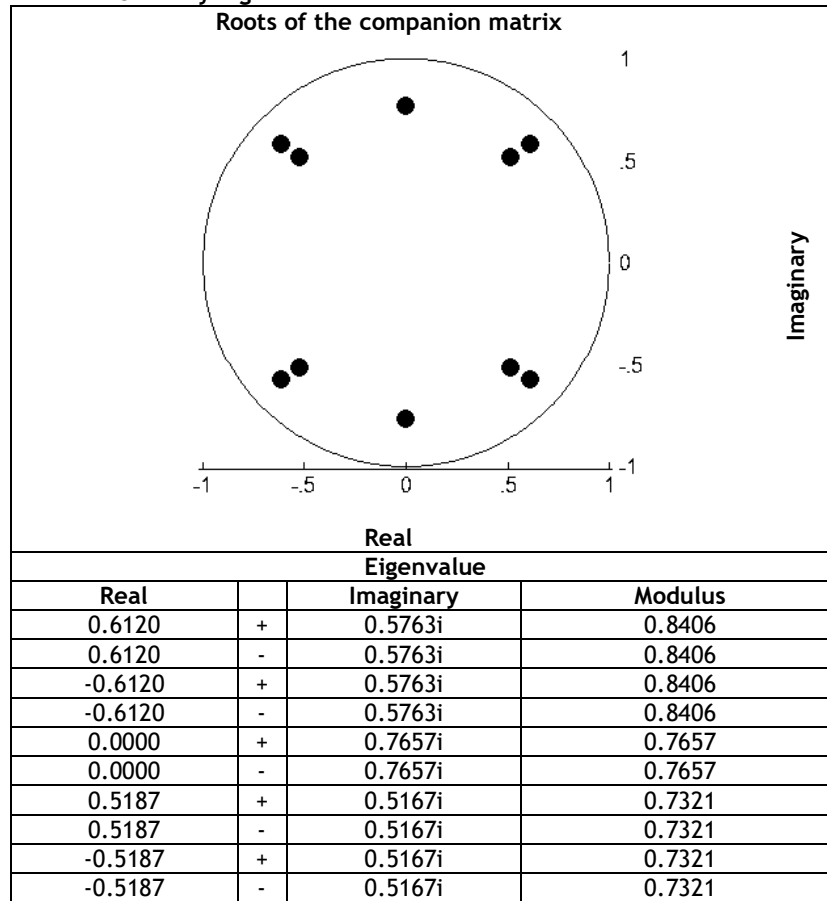
The robustness tests were applied to the model and reveal through Wald lag exclusion that the number of lags was assertive, with χ^2 of 1% for all variables and for the model. Details, table 6.

Table 6 - Wald lag-exclusion results

Equação: dlper			
lag	chi2	df	Prob>chi2
2	19.24809	5	0.002
Equation: dlgdp			
lag	chi2	df	Prob>chi2
2	81.49594	5	0.000
Equation: ddese			
lag	chi2	df	Prob>chi2
2	43.03139	5	0.000
Equation: dlpop			
Lag	chi2	df	Prob>chi2
2	31.86819	5	0.000
Equation: dkof			
lag	chi2	df	Prob>chi2
2	19.27037	5	0.002
Equation: All			
lag	chi2	df	Prob>chi2
2	317.6048	25	0.000

The stability condition is often referred to as stationarity condition in the time series literature Lütkepohl (2005). Details table 7, where the stable VAR(p) is stationary, because stability implies stationarity.

Table 7 - Stability Eigenvalue test



The normality statistics were still tested, the results of Jarque-Bera, Skewness and Kurtosis present results within the normal range, table A6 details in the appendix.

ARDL model

For the ARDL model the embedded time horizon is from 1995 to 2015. Table 8 presents the variables used in this model, their acronyms and the transformations performed.

Table 8 - Description of the data (ARDL)

Variables	Acronym	Source	Transformation		
Pilgrims	lperpc	SESDI	Per capita		
International tourism, number of arrivals	lchegpc	Worldbank	Per capita		
Travel services (% of service imports, BoP)	lservpc	Worldbank	Per capita		
GDP (constant LCU)	lgdppc	Worldbank	Per capita		
Unemployment, total (% of total labor force) (national estimate)	dese	Worldbank			
Population total	pop	Worldbank			
Descriptive statistics					
Variables	Obs	Mean	Std. Dev.	Min	Max
lperpc	21	-2.733983	0.1999859	-3.01463	-2.233382
lchegpc	21	-0.513629	0.2020391	-0.7901027	-0.0394907
lservpc	21	-12.71263	0.1189208	-12.89408	-12.52016
lgdppc	21	9.686643	0.0628055	9.521614	9.754846
dese	21	8.399048	3.784867	3.82	16.18
l denotes natural logarithm					

The descriptive statistics of the model reveals the nature of the variables that were initially transformed into per capita and passed to natural logarithms. Other tests, namely ADF and PP, were applied to provide more characteristics about the data (details table A8). In table 9 the mean of the VIF statistic reveals that the model is within the standards to proceed with the estimation.

Table 9 - VIF statistic

Variables	VIF	1/VIF	Variable	VIF	1/VIF
dese	7.68	0.1303	ddese	3	0.3333
lservpc	6.81	0.1469	dlgdppc	2.5	0.3996
lchegpc	4.76	0.2103	dlchegpc	1.35	0.7412
lgdppc	4.04	0.2477	dlservpc	1.04	0.9638
Mean VIF	5.82		Mean VIF	1.97	

The correlation matrix did not present any value that compromises the estimation, details in table A7 (appendix). The ARDL model was then estimated as can be observed in table 10.

Table 10 - ARDL model results

Dependent Variable: DLPERPC	
Short-run impacts	Coefficient
DLPERPC(-1)	0.460424***
DLCHEGPC	1.332109***
DLGDPPC(-1)	3.285263***
DDESE	0.078801***
ECM	-2.035136***
Elasticities	
LGDPPC(-1)	-1.744777***
LSERVPC(-1)	0.550252***
DESE(-1)	-0.009638**
Constant	43.11438***
Diagnostics tests	
\bar{R}^2	0.840513
Jarque-Bera	0.838698
LM (1 lags)	0.2338
ARCH (1 lags)	0.2325
BPG	0.5811
RESET	0.1537

Notes: D and L indicate first differences and natural logarithm, respectively; ***, ** and * denotes 1%, 5% or 10% statistical significance level, respectively; \bar{R}^2 : Adjusted R-squared; BPG: Breusch-Pagan-Godfrey; LM: Breusch-Godfrey Serial Correlation LM test; RESET: Ramsey RESET test; ARCH: Heteroskedasticity test ARCH.

The results of the model presented ECM of -2.03 and \bar{R}^2 of 0.84%, values acceptable for an estimation. It is noted that when the pilgrimage increases by 1%, there is an increase of 0.46% in short-term pilgrimages. International arrivals and GDP also have a positive effect on short-term pilgrimages, 1.33% and 3.28%, respectively. Unemployment shows a low impact in the short term, when it increases by 1% the pilgrimages increase by 0.08%. In the long run, GDP and unemployment have a negative effect on pilgrimages -1.74 and -0.01, respectively. Expenditure on travel services shows a positive sign in the long term, that is, when travel expenses increase by 1%, pilgrimages increase by 0.55%.

A battery of post-test tests was performed to support the results presented by the model (Jarque-Bera, LM test, ARCH, BPG and RESET) all presented results within normality. The stability of the coefficients is observed through the results of the CUSUM and CUSUM of squares tests. Details, figure 4.

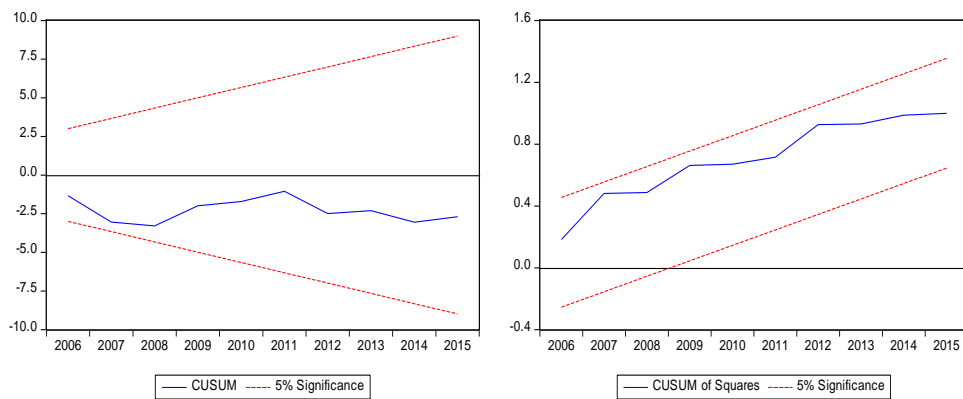


Figure 4 - Stability of coefficients

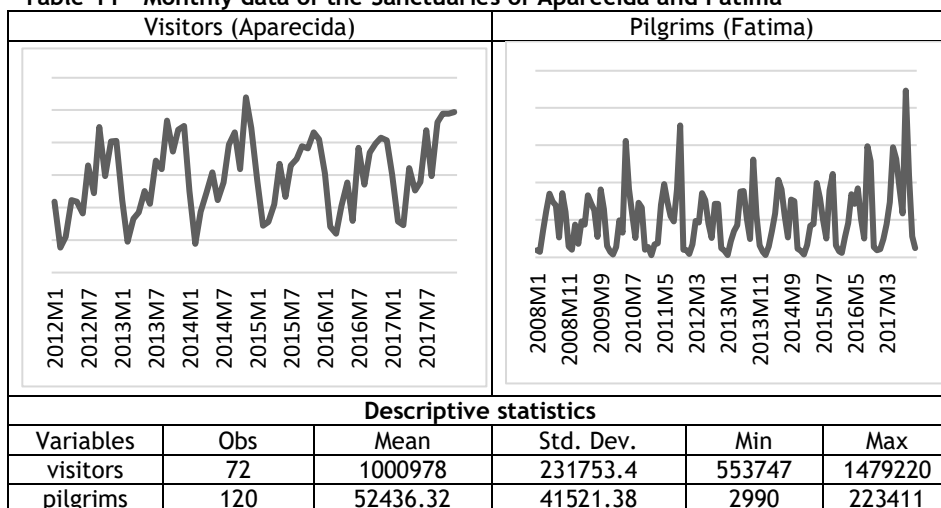
Due to the proximity of the 5% barrier stability line during the period of the economic crisis, in future research the use of impulse dummies will be necessary to control a possible structural rupture in the time series. However, given the short time horizon applied in this model, it can be assumed that there is stability in the coefficients analyzed.

ARIMA model

In this model of prediction, the numbers of the Sanctuary of Aparecida are used for the first time in this dissertation. The team of auditors of the Sanctuary Security Department, counts the faithful who are visiting the Brazilian Sanctuary. They count people through the parking ratchets and by numbers of vehicles received in the city. The records of the pilgrimages (so it is commonly known the forms of visitation to religious places in Brazil) executed in the Secretary of Pastoral are also used to obtain the final numbers.

The only available statistical information of the Sanctuary of Aparecida is the annual number of visitors, but the administration of the Catholic temple by means of the Press Service provided monthly data of the number of visitors comprising information from 2012 to 2017, details can be observed in table 11, together with the data of the monthly pilgrims of the Sanctuary of Fatima (comprising data from January 2008 to December 2017).

Table 11 - Monthly data of the Sanctuaries of Aparecida and Fatima



From the sample of pilgrims visiting the Sanctuary of Fatima in November, the number of people decreases and resumes growth between March and April of the following year. While the Sanctuary of Aparecida the period of low of the visitors begins in January and resumes growth between March and April.

There is a great similarity with the phenomenon of the pilgrimages to the Sanctuary of Fatima and the visits to the Sanctuary of Aparecida, both demonstrate the creased pattern and the structure also reveals a strong seasonality. To verify more characteristics of the variables the ADF test (table A9) indicates that both series are not stationary (in level).

To improve the estimation of the model, we chose to use the EViews add-ins, Automatic ARIMA Selection, in this procedure we used the variable in natural logarithms and obtained, Seasonal Autoregressive Error Specification (SAR)12, the others model specifications can be seen in the OLS regression (table 12).

Table 12 - OLS regression (forecast for Aparecida)

Dependent Variable: DLVISITORS				
Method: ARMA Maximum Likelihood (BFGS)				
Sample: 2012M02 2017M12 - Included observations: 71				
Convergence achieved after 39 iterations				
Coefficient covariance computed using outer product of gradients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-1.086199	0.059988	-18.10706	0.0000
AR(2)	-0.925325	0.057118	-16.20025	0.0000
SAR(12)	0.998667	0.005674	176.0031	0.0000
MA(3)	-0.670577	0.114445	-5.859390	0.0000
SMA(12)	-0.821107	0.358248	-2.292006	0.0252
SIGMASQ	0.005620	0.001804	3.115828	0.0027
R ²	0.888899	Mean dependent var		0.007163
\bar{R}^2	0.880353	S.D. dependent var		0.226502
S.E. of regression	0.078347	Akaike info criterion		-1.545423
Sum squared resid	0.398986	Schwarz criterion		-1.354211
Log likelihood	60.86252	Hannan-Quinn criter.		-1.469384
Durbin-Watson stat	1.613239			
The operators "L" and "D" denote natural logarithm and first differences, respectively.				

The R² (0.89%) indicates that the model has ideal forecasting capability. The constant and the terms of the moving average error specification (1 and 2) were removed from the regression because they were not statistically significant. The residuals of the estimation do not present any abnormality. Details can be seen in the appendix, graph A2. The model also agrees with the literature regarding the sample size (Cavalcanti Netto, 2007).

For forecasting the autocorrelation is important, because they indicate which past series values are most useful in predicting future values. The Durbin-Watson (DW) statistic has a low value, which would indicate a possible autocorrelation in the model. But to validate this hypothesis through the DW statistic, the presence of the constant was necessary. The Arima Selection function indicates the terms autoregressive and moving average, so the analysis of the autocorrelation function was not necessary.

In table 13, presents the regression for the prediction of the pilgrims of the Sanctuary of Fatima.

Table 13 - OLS regression (forecast for Fatima)

Dependent Variable: DLPILGRIMS				
Method: ARMA Maximum Likelihood (BFGS)				
Sample: 2008M02 2017M12 - Included observations: 119				
Convergence achieved after 31 iterations				
Coefficient covariance computed using outer product of gradients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(2)	0.265154	0.095549	2.775063	0.0065
SAR(12)	0.990789	0.010232	96.83644	0.0000
MA(1)	-0.992120	0.023147	-42.86260	0.0000
SMA(12)	-0.655486	0.101103	-6.483351	0.0000
SIGMASQ	0.140679	0.014862	9.465665	0.0000
R^2	0.840170	Mean dependent var		0.002123
\bar{R}^2	0.834562	S.D. dependent var		0.942145
S.E. of regression	0.383209	Akaike info criterion		1.214200
Sum squared resid	16.74077	Schwarz criterion		1.330970
Log likelihood	-67.24488	Hannan-Quinn criter.		1.261616
Durbin-Watson stat	1.861261			

The R^2 of the model for forecasting the Sanctuary of Fatima is 0.84%. The \bar{R}^2 is 0.83%, indicating a good forecasting capacity. The constant and the term AR(1) were removed from the regression because they were not statistically significant. In graph A3, details of the residuals from the estimation can be observed.

As in the previous model the Durbin-Watson statistic presents a low value. Again, the assumption for the validity of autocorrelation through the DW statistic can not be confirmed due to the removal of the constant. Through the Arima Selection function, the ARIMA model was obtained, also with the presence of seasonality (SARIMA).

Following the EViews Forecast function was used and the results of the estimation can be seen in table 14.

Table 14 - Forecast

	Aparecida	Fatima
Actual	DLVISITORS	DLPILGRIMS
Forecast sample	2012M01 2018M12	2008M01 2018M12
Adjusted sample	2013M04 2018M12	2009M04 2018M12
Included observations	69	117
Root Mean Squared Error	0.139115	0.811541
Mean Absolute Error	0.116806	0.560798
Mean Absolute Percentage Error	1719.137	253.5767
Theil Inequality Coef.	0.321347	0.491186
<i>Bias Proportion</i>	0.000447	0.000000
<i>Variance Proportion</i>	0.001074	0.082732
<i>Covariance Proportion</i>	0.998479	0.917268
Theil U2 Coefficient	5.022116	0.209291
Symmetric MAPE	88.06706	96.67057

In short, the result of the forecast for Aparecida points to Theil Inequality Coefficient of 0.321, Bias Proportion corresponding to 0.000%, Variance Proportion to 0.001 and Covariance Proportion is 0.998. While for The Sanctuary of Fatima, Theil Inequality Coefficient is 0.491, Bias Proportion corresponding to 0.000%, Variance Proportion at 0.083 and Covariance Proportion is 0.917.

The system performed the automatic adjustment of Aparecida sample for the period of April 2013 and April 2009 for Fatima. In the case of monthly series, twelve months were defined as the forecast period for 2018. Details in figure 5.

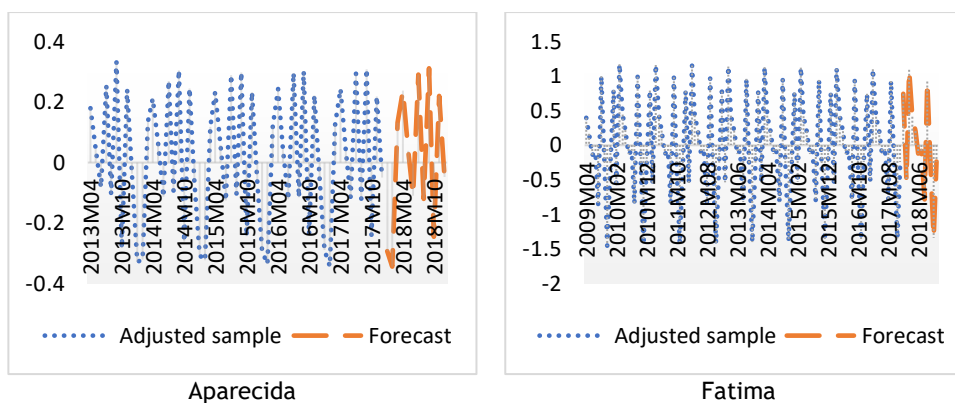


Figure 5 -Visitors and pilgrims forecasting

To verify the robustness of the estimates, the ARCH test of Heteroskedasticity and the Jarque-Bera statistic were tested. Details table 15.

Table 15 - Robustness of the forecast model

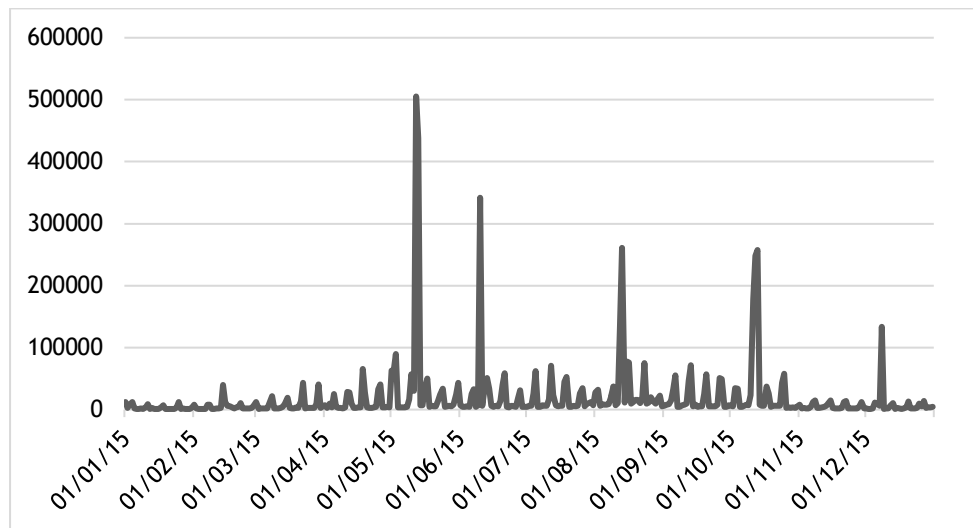
Aparecida			
ARCH			
F-statistic	1.4125	Prob. F(1,91)	0.2388
Obs* R ²	1.4244	Prob. Chi-Square(1)	0.2327
Jarque-Bera			
Jarque-Bera	0.840860	Probability	0.656764
Fatima			
ARCH			
F-statistic	1.44E-07	Prob. F(1,116)	0.9997
Obs* R ²	1.46E-07	Prob. Chi-Square(1)	0.9997
Jarque-Bera			
Jarque-Bera	84.88813	Probability	0.000000

From the results, it is confirmed that the models do not have heteroscedasticity, which was expected, since only historical data are used for prediction, in this way the model is homoscedastic. The presence of conditional autoregressive heteroscedasticity would not invalidate the method, but could result

in a loss of efficiency in the SARIMA forecast, also indicating a possible GARCH forecast. The Jarque-Bera test for Fatima shows that the wastes are not normally distributed. Similar results were found by Yuan (2016) which clarifies that the non-normal distribution of residues can be caused by not treating a possible non-linear characteristic.

OLS regression

For the year 2015, the Sanctuary of Fatima made available a series containing the number of daily visitors (comprising data from January 1th to December 31th), in this variable the visitors and pilgrims are not distinguished, that is, the total of people who have visited the Sacred space. Sample details, graph 5.



Graph 5 - Visitors in 2015 (Sanctuary of Fatima)

As shown in the graph, one can see the huge volatility in the number of visitors throughout the year. There are 5 peaks that exceed 100,000 visitors. Being the celebration of the feast of the first appearance (happened on 05/13/1917) the period that takes the greatest influx of visitors to the Marian Sanctuary. Table 16 presents the description of the data and descriptive statistics of the variables.

Table 16 - Daily data of the Sanctuary of Fatima

Variables	Acronym	Source	Transformation		
Nominal exchange rate (euro x dollar)	txcd	European Central Bank			
Rain volume	lach	<i>Sistema Nacional de Informação de Recursos Hídricos -SNIRH</i>	For series not containing breaks, the data of 01/10/2015, 01/09/2015 and 24/10/2015, were created from the average between the previous day and later.		
Average temperature per day	ltemp	<i>Sistema Nacional de Informação de Recursos Hídricos -SNIRH</i>	The informations are from the meteorological station of Batalha (16E / 06E). However, between 02/12/2015 to 03/02/2015 the data were from the meteorological station of Pedrogão (16F / 04C).		
Energy consumption	lce	Central collection and publication of electricity generation, transportation and consumption data and information for the pan-European market.	The daily data is the result of the sum of the hourly data		
Descriptive statistics					
Variables	Obs	Mean	Std. Dev.	Min	Max
lvis	365	8.821693	1.22014	6.818924	13.13277
lce	365	11.80164	0.1011144	11.49574	12.03012
ltemp	365	2.635896	0.3871062	0.9162908	3.218876
lach	365	0.5274844	0.8780171	0	4.012773
txcd	365	1.109995	0.0292056	1.0552	1.2141
Notes: Gaps in exchange rates (weekends, holidays and holidays due to holidays) were filled with the reference value of the previous business day closing; l denotes natural logarithm.					

For more data characteristics, two different unit root tests were used to evaluate the order of integration, namely the ADF test and the PP test (details, table A10, appendix). The results of the correlation matrix (table A11, appendix) and the VIF statistic (table A12, appendix) revealed no abnormality. The sequence was then regressed. For details see table 17.

Table 17 - OLS regression (visitants)

Dependent Variable: LVIS				
Method: Least Squares				
Sample: 1/01/2015 to 31/12/2015				
Included observations: 365				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	61.21486	5.204322	11.76231	0.0000
TREND	-0.000669	0.000291	-2.300948	0.0220
LCE	-5.333259	0.439548	-12.13352	0.0000
TXCD	7.374981	0.980894	7.518634	0.0000
LTEMP	0.847496	0.082349	10.29152	0.0000
LACH	-0.162886	0.030088	-5.413673	0.0000
D6	0.845237	0.089682	9.424846	0.0000
D7	0.997668	0.109864	9.080901	0.0000
D_04_04_2015	-2.301118	0.494697	-4.651574	0.0000
D_13_05_2015	4.205274	0.487463	8.626865	0.0000
D_12_05_2015	4.303246	0.487252	8.831669	0.0000
D_10_06_2015	3.117066	0.490812	6.350837	0.0000
D_12_08_2015	2.771592	0.487307	5.687568	0.0000
D_13_08_2015	3.417441	0.487474	7.010505	0.0000
D_12_10_2015	3.903073	0.495336	7.879653	0.0000
D_13_10_2015	3.919481	0.491292	7.977912	0.0000
D_08_12_2015	3.333025	0.489151	6.813898	0.0000
R^2	0.848848	Mean dependent var	8.821693	
\bar{R}^2	0.841898	S.D. dependent var	1.220140	
S.E. of regression	0.485153	Akaike info criterion	1.436749	
Sum squared resid	81.90983	Schwarz criterion	1.618388	
Log likelihood	-245.2068	Hannan-Quinn criter.	1.508935	
F-statistic	122.1445	Durbin-Watson stat	1.185908	
Prob(F-statistic)	0.000000			

The model that seeks to explain the number of visits daily to the Sanctuary of Fatima has excellent values for R^2 and \bar{R}^2 , are 0.85% and 0.84%, respectively. The statistical probability for the explanatory variables is 1%. The result of the DW statistic is 1.19, indicating a possible autocorrelation. However, the omission of important explanatory variables for the model may have generated the low DW value. In the ARDL and VAR models, there are examples of variables with statistically significant probability that can be used in the future.

The autoregressive nature of the dependent variable (visitors), indicates that the model can also be estimated with its lag, which was also tested, but it was preferred to present the most parsimonious model. Residues from the estimation are normal. Details can be seen in graph A4, in appendix. As for the distribution of the data, it is assumed normality, based on the Central Limit Theorem, due to the large number of observations.

Fuinhas et al. (2018) proposed the hypothesis that climatic factors could impact pilgrimages. The negative coefficient in the rain variable (LACH) reveals what was observable, a negative impact on the number of people traveling to the Marian

temple and that when the average daytime temperature (LTEMP) rises, there is a positive impact with the highest number of people arriving in Fatima.

The LCE and TXCD variables showed expressive coefficients -5.33 and 7.37 percent, respectively. The dummies D6 (Saturdays) and D7 (Sundays) incorporated in the model were used to measure the importance of weekends on visits and have coefficients close to 1 to 1% of aesthetic probability. When taken from the model, R^2 drops to 0.80% and the Ramsey reset test shows t-statistic of 0.0015. Confirming missing important variables for the model.

Other dates, such as national holidays, religious holidays, and weekday holidays, were tested as daily dummies but showed no statistically significant probability for the year 2015. However, the number of visitors on those holidays was only lower than the average for the week in an opportunity, at the commemoration of Easter.

The first impulse dummy applied on April 4th, 2015, was applied because the date preceded Jesus' Passover, is that it is the largest Catholic feast and moves people to great Sanctuaries worldwide. On 12th and 13th of May another two dummies were inserted to absorb the large number of people who participated in the celebration of the anniversary of the first appearance. On June 10th, the famous National Children's Pilgrimage took place, which justifies the high number of people present and the need to include another intervention.

On the 12th and 13th of August (pilgrimage of the migrants) the thousands of pilgrims passed through the Sanctuary which resulted in another great outlier, similarly controlled. Already on the 12th and 13th of October, which recalls the last Marian apparition, the Sanctuary received another astounding number of people. The last dummy included in the model (December 08th) is the date of another great Catholic Christian holiday (and national holiday in Portugal), the celebration of the Immaculate Conception of Mary, a title defended by Blessed Duns Scotus, for more (Bento XVI, 2010).

After the estimation, several tests were performed to give robustness to the results. In table 18, shows the results of the Ramsey RESET test.

Table 18 - Ramsey RESET test

Equation: UNTITLED			
Specification: LVIS C TREND LCE TXCD LTEMP LACH D6 D7 D_04_04_2015 D_12_05_2015 D_13_05_2015 D_10_06_2015 D_12_08_2015 D_13_08_2015 D_12_10_2015 D_13_10_2015 D_08_12_2015			
Omitted Variables: Squares of fitted values			
	Value	df	Probability
t-statistic	1.391825	347	0.1649
F-statistic	1.937176	(1, 347)	0.1649
Likelihood ratio	2.031996	1	0.1540

The Ramsey Reset test presents a probability of 0.1649, we can conclude that the regression follows statistical normality. The results are in agreement with the central limit theorem, that is, when the sample size is large, the distribution of the mean is an approximately normal distribution. Table 19 shows the results of the heteroskedasticity check.

Table 19 - Heteroskedasticity test

Heteroskedasticity test: Breusch-Pagan-Godfrey			
F-statistic	0.842080	Prob. F(16,348)	0.6372
Obs* R ²	13.60474	Prob. Chi-Square(16)	0.6281
Scaled explained SS	21.54511	Prob. Chi-Square(16)	0.1585
Heteroskedasticity test: ARCH			
F-statistic	2.992510	Prob. F(1,362)	0.0845
Obs* R ²	2.984372	Prob. Chi-Square(1)	0.0841
Heteroskedasticity test: Glejser			
F-statistic	1.451417	Prob. F(16,348)	0.1157
Obs* R ²	22.83340	Prob. Chi-Square(16)	0.1183
Scaled explained SS	26.46629	Prob. Chi-Square(16)	0.0478

We conclude that the model is homoscedastic, but there is still a little ARCH effect, it opens the hypothesis for analyzes with models that deal better with the volatility in time series. In the next chapter of this dissertation several issues are discussed regarding Religious Tourism and Economy, as well as the proposal of public measures.

5. Discussion of results

This century also known as information century, it is necessary to retain data and use them. Temples as a place of worship often do not have this concern, but the faster religions become aware of the wealth of information, how soon they can adjust to continue providing religious services with more and greater use, and collaborate in the environment where they are inserted. Several public and private sector initiatives can benefit from better management of this information.

The Catholic Church has for centuries been recognized as a mother and teacher. But studying the Church or means where your temples are is not an easy task. Understanding phenomena such as pilgrimages and visits, under the light of social and human sciences, provides a theoretical basis to assist in making decisions regarding the management of the Sanctuary and the agents involved in religious tourism.

In the case of religious tourism and urban planning, the city of Fatima is an example to be followed in Catholicism and in religions. The Sanctuary of Fatima is also a reference in studies and research, since the founding of SESDI, the researchers count highly qualified professionals for the assistance and support for the development of scientific studies of several areas of knowledge. While the Brazilian Sanctuary has only the Marial Academy, with a strong dedication to theological-Marian studies.

In the encyclical *Fides et Ratio* (João Paulo II, 1998) addresses the relationship between faith and reason, elucidating that through these two wings the human spirit rises to the contemplation of truth. Interpellating religions and / or temples about something that is not your primary goal can create discomfort, but from discomfort, innovations and successful partnerships can be born. Initiatives such as the promotion of studies, meetings and scientific publications are examples of actions that can be established or improved.

The portuguese author Bento (2016) shows several studies where Portugal was integrated, and the results suggest that tourism generates economic growth in Portugal, our results indicate that pilgrimages depend on economic growth, thus assuming the hypothesis of TLGH conservation. It also confirms that more collaborative measures are being developed.

For Alegre et al. (2013) participation in tourism can be affected by the loss of family income, however, our results show that in the context of the pilgrimages unemployment favors them in the short term. While in the long run it is seen that unemployment is negatively affecting pilgrimages. Thus arise important questions

for other areas of social and human sciences, namely: (i) is the individual's faith above rationality, influencing him to wander even with a deferral of his income? and (ii) In a situation of crisis that lasts the belief can be affected and with this influence the competences and the ability to generate wealth of the individual?

The results also showed that there is no statistical relationship between national and religious commemorative holidays, but this does not mean that holidays and visits are not important. In 2015, the number of national holidays was reduced in Portugal due to the economic crisis. But the limitation of the data did not allow a comparison with other years. Once again one sees the gap to be worked by the Sanctuaries, retaining information so that other agents can collaborate with empirical studies and public measures.

The survey also found that the last and first months of the year are the periods when Sanctuaries tend to receive fewer visits. This finding inspired us to propose measures to promote incentives for the distribution of the flow of people through the sub-diversification of tourism in the cities of Fatima and Aparecida (which may benefit other cities that focus on Marian religious tourism).

Kurmanaliyeva et al. (2014) and Rossini et al (2016) point out that tourism potential is not used in full and there is room for adequacy. The diversification of tourism in the two cities can contribute to increase the number of pilgrims and visitors in periods of low demand, against the literature (Aulet et al., 2017).

In order to reinvent itself as destinations for religious tourism, it will be necessary to prepare a careful analysis, as well as proposals for measures that are feasible in view of the adversities encountered, respectively, regarding the flow of people. Further research can and should be drawn from this fact, to better follow the economic growth of the region and propose public policies that favor residents, visitors, religious tourists and others.

A logistical study is suggested, thinking of the reorganization of the pilgrimages coming from the dioceses and / or national and international religious movements. This would collaborate to accentuate the displacement of the number of pilgrims for the months of smaller presence in the Sanctuaries. However, some precautions should be taken into account, for example, the local festivals that attract many people to the religious center.

The strategic growth of the region based on the sub-diversification of the type of tourism could be another important measure that will contribute to a stabilization in the number of pilgrims visiting the Sanctuaries. In the Brazilian case we are already talking about the materialization of a religious cluster between the cities of Aparecida, Guaratinguetá and Cachoeira Paulista. It should be noted that,

when sub-diversification is indicated, it does not substitute for the main factor that motivates the displacement of a tourist, but adds to the main cause, products and / or services of specific interest to this public.

The Sanctuary of Fatima together with the religious congregations of the region have the physical space and the necessary know-how to better explore spiritual tourism, which can be defined as a form of sub-diversification of religious tourism or even as a complement to it.

Visits or pilgrimages may not be enough to provide the encounter with the Sacred, so spiritual retreats run either by the Sanctuaries or by the religious congregations that surround them could be the supplement for those who could not "detach themselves from the world."

It is stressed that measures and investments must be applied in order not to conflict with the focus of tourism in the region and at the same time collaborate to reduce seasonality. Religious tourists also have an interest in local experiences. These experiences may be before, during or after contact with the Sacred, however, new establishments of gastronomic and / or cultural entertainment, which may arise, should be concerned to know how to share the sacred of the profane, which has been widely debated by Durkheim (1912). The result will possibly generate the filling of the valleys⁹ and the attraction of more pilgrims as shown in figure 6.

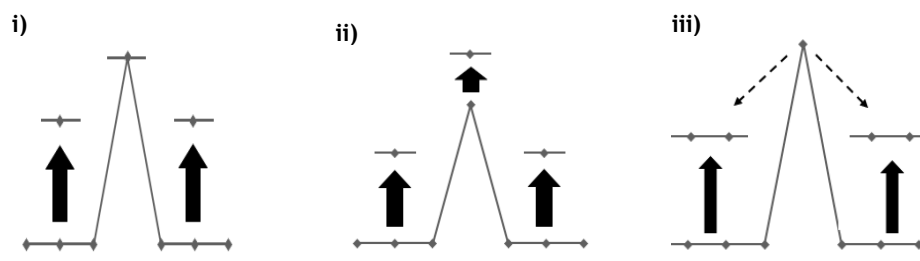


Figure 6 - Seasonality control

Figure 6 illustrates the various possibilities of transfer, growth and filling of the valleys that aim to work on the seasonality problem. It is well known that climate change has impacts on every society. In this aspect there is no distinction of creed or nationality, all are affected. It is also known that only 16% of the world's population says they are not affiliated with any religion (Pew Research Center, 2017), so religious leaders play an important role in raising awareness of the effects of environmental degradation. What we want to express is that religions can and should

⁹ Valleys are periods of low visitation and pilgrimages.

contribute to the current need to care for the environment, since the environment also impacts religion.

For example, the winter period for Europeans is much denser and worrying compared to the diversified Brazilian climate. Catholics (and non-Catholics) who visit the Sanctuary of Fatima face varying temperatures throughout the year and find a real impact on the number of visitors to the Sanctuary. Results such as these were also found earlier, but among Protestants, those studied by Marcum (1999) and Olson (2008) show details of this relationship climate and religion.

Climate change must be a concern of all religions, but this is not the current reality. Sachdeva (2016) points out that despite the fact that many cultural and religious structures emphasize sacred aspects of our natural world, this motivating power is not as direct as environmental protectionism. The lack of initiatives represents the lack of opportunities to conserve the importance of taking care of nature, failing to collect effective measures for the reduction of CO2 emissions, which produces the greenhouse effect.

The proposed debate does not refer only to perch of visitors to a temple, motivated by unpredictable weather patterns. But he points out that the environmental degradation generates the real possibility of the loss of passers-by which goes against the literature (Dube & Nhamo, 2018). The Sanctuary of Fatima in this way joined with local economic agents could develop more campaigns and charitable events mainly for the winter period. Attracting more people in the period of low demand. For economics scholars it is suggested the development of research relating climate variables and pilgrimages, in order to verify the real impact in the short and long term. Another hypothesis to be explored is that public investment has a causal relationship with Portuguese Marian religious tourism.

Summarizing in some countries and regions, religious tourism plays a key role in local economic development and sustainability. The growth of Catholic believers and believers is likely to increase the number of future pilgrims to the Marian Sanctuaries, even without the existence of new mystical events.

6. Conclusions

For centuries pilgrimages are present in Christianity, the last census of the Vatican shows the increase of Catholics indicating a good prospect of visits to the Marian Sanctuaries around the world.

The Sanctuary of Our Lady of the Rosary of Fatima in Portugal and the Sanctuary of Our Lady of Conception Aparecida in Brazil provided statistical information on pilgrimages and visits. It is emphasized that the general objective of this dissertation was reached. We thus obtained empirical results on the economic determinants of Marian religious tourism (or Marian Pilgrimages).

It is recalled that the three specific objectives proposed were fulfilled, namely: (i) to present the empirical results of the relation of the economic variables with the Marian Pilgrimages of Fatima (through models four econometric models - VAR, ARDL, SARIMA and OLS regression); (ii) assess the relationship between climate and visitation to the Sanctuary of Fatima; and (iii) predict the future number of pilgrims to the Santuaries of Fatima and Aparecida.

From the hypotheses proposed in this dissertation was verified the existence of the causal relationship between the GDP and the pilgrimages. This result in light of the hypotheses of tourism-led growth is understood as causal relation of conservation, where the causal GDP unidirectionally the tourism. The results of the VAR model still captured the unidirectional causal relationship of unemployment on pilgrimages.

The results of the ARDL model confirm the relationship between unemployment and pilgrimages, but show that the impact of unemployment on pilgrimages is low. Causing a positive effect in the short term and negative in the long run.

The impact of international arrivals is highly significant in the short term. While spending on travel services is significant only in the long run, thus reaffirming that pilgrimages depend on the good economic momentum and the tourism sector.

Another confirmed hypothesis was that climatic factors influence the number of visits to the Sanctuary of Fatima. The variables rainfall volume and mean temperature were statistically significant. Exalting the need for more discussion on environmental issues in the sanctuaries and in the Catholic creed itself.

Seasonality in Marian religious tourism has also been confirmed. This hypothesis was tested in the two Sanctuaries analyzed. The results of the SARIMA model can also benefit those responsible for public services in the Sanctuaries region,

because in advance, it will be possible to organize for the periods that the Sanctuaries will receive more or less visitors (or pilgrims in the Fatima case).

The results of this study allow a new look at religious tourism in the Marian context, since it generates empirical results that benefit various agents, from public policy makers, tourism, public service providers (hospitals, firemen, cleaning) and own administration of the Sanctuaries.

New research questions are raised and debated, namely: (i) reinventing is necessary to reduce seasonality and continue to move the local economy - new services that do not conflict with the characteristics of the destination are necessary; (ii) logistic studies that allow the Sanctuaries to be able to indicate to the pilgrims a better period to attend the sacred site; (iii) how religious leaders can inflame their believers to effectively collaborate on environmental and economic issues?; (iv) to expand the studies on the relation of the climate and the participation of the people in catholic cults; and (v) how to clarify the importance of information for religions? - the benefits that a database can generate for temples and for every local economy.

For Christians, the pilgrimage is another way to obtain the encounter with the Sacred. There are economies that depend directly on religious tourists. The expansion of the knowledge of the relationship between economy and pilgrims / visitors can generate important benefits for the local economy and the tourism sector.

7. References

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8. Appendix

Table A1 - Relationship between tourism and economic growth

Latin America				
Author (year)	Place	Period studied	Methodology	Causal relation
Sokhanvara et al. (2018)	Brazil and Mexico	1995-2014	Granger causality	T → Y
Sokhanvara et al. (2018)	Peru	1995-2014	Granger causality	T ← Y
Sokhanvara et al. (2018)	Chile	1995-2014	Granger causality	T ↔ Y
Rivera, M. A. (2017)	Ecuador	N. A.	Granger causality	T ← Y
Shahzad et. al. (2017)	Mexico and US	1990-2015	Quantile-on-Quantile	T → Y
Ghartey (2013)	Jamaica	1963-2008	VECM and Granger causality	T ↔ Y
Brida et al. (2011a)	Brazil	1965-2007 and 1990 - 2005	Dynamic Panel Data and Cointegration Analysis	Neutral
Brida & Risso (2009)	Chile	1988-2008	VECM and Granger causality	T → Y
Brida et al. (2008b)	Mexico	1980-2007	VECM and Granger causality	T → Y
Europe				
Shahzad et. Al. (2017)	France, Spain, Germany, Italy, Russia and United Kingdom	1990-2015	Quantile-on-Quantile	T → Y
Bento (2016)	Portugal	1995 - 2015	Granger causality	T → Y
Payne & Mervar (2010).	Croatia	2000: 1 - 2008: 3	Toda-Yamamoto causality	T ← Y
Balaguer & Cantavella-Jorda (2002)	Spain	1975-1997	Error Correction Model	T → Y
Dritsakis (2004)	Greece	1960-2000	Error Correction Model	T ↔ Y
Africa				
Kibara et al. (2012)	Kenya	1983-2010	ARDL and Granger causality test	T → Y
Akinboade & Braimoh (2010).	South Africa	1980-2005	VECM and Granger causality	T → Y
Asia				
Sokhanvara et al. (2018)	China, Indonesia and India	1995-2014	Granger causality	T ← Y
Shahzad et al. (2017)	China e Turkey,	1990-2015	Quantile-on-Quantile	T → Y
Shahbaz et al. (2017)	Malaysia	1975-2013	Granger causality	T ↔ Y
Kim et al. (2006)	Taiwan	1971-2003	Granger causality	T ↔ Y
Oh (2005)	Korea	1975-2001	Granger causality	T → Y
Lee (2012)	Singapore	1980-2007	Granger causality	T ← Y
Oceania				
Jaforullah, M. (2015).	New Zealand	1972-2012	VECM	T → Y
Corrie et al. (2013)	Australia	N.A	Granger causality	T ↔ Y

T → Y: Evidence regarding the hypothesis of growth by tourism; T ← Y: Evidence regarding the conservation hypothesis; T ↔ Y: Evidence regarding the feedback hypothesis; Neutral: Evidence concerning the hypothesis of neutrality. N.A .: Not applicable

Table A2 -Golden rose distinction

Year of delivery	Pope offering	Sanctuary of Aparecida	Sanctuary of Fatima	Year of delivery
1965	Paulo VI		X	Closure of the third session of the Second Vatican Council; Apostolic Exhortation Marialis cultus (where he proclaimed Mary Mother of the Church); and Paternal affection for the Portuguese nation
1967	Paulo VI	X		Celebration of the 250 years of the encounter of the image
2007	Bento XVI	X		Celebration of the 290 years of the encounter of the image
2010	Bento XVI		X	Homage of gratitude
2017	Francisco	X	X	Celebration of the 300 years of the image of Our Lady Aparecida and Celebration of the Centenary of the Marian Apparitions in Fatima

Note: X means that the Sanctuaries received the distinction that year.

Table A3 - Unit roots test (VAR)

Variables	Level		First differences		
	ADF	PP	ADF	PP	
lper	τ	-4.794208(0)***	-4.721220(1)***	-5.203974(3)***	-11.20399(19)***
	μ	-1.789314(0)	-1.789314(0)	-4.827989(0)***	-8.367151(12)***
lgdp	τ	-1.861398(0)	-1.899068(3)	-2.945062(0)	-2.785849(3)
	μ	-4.503017(0)***	-4.053778(1)***	-2.323794(0)	-2.244027(3)
lpop	τ	0.804502(2)	2.209419(2)	-4.202332(1)**	-2.238952(0)
	μ	-2.403779(3)	-2.271597(3)	-0.145773(2)	-0.191648(2)
dese	τ	-2.764037(1)	-1.856240(1)	-3.516893(4)*	-2.245749(0)
	μ	-1.319177(1)	-0.736800(2)	-2.357633(0)	-2.405698(1)
kof	τ	-2.538418(0)	-3.785975(18)**	-4.855534(1)***	-7.754035(19)***
	μ	-3.382378(2)**	-5.479548(16)***	-3.830571(1)**	-4.377107(7)***

Notes: In () the numbers of lags; μ stands for Constant; τ stands for Constant and Trend. ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Table A4 -VIF statistic (VAR)

Variable	VIF	1/VIF
dlper	n.a.	n.a.
dlgdp	4.24	0.235744
ddese	2.49	0.402239
dlpop	2.03	0.491605
dkof	1.49	0.670952
Mean VIF	2.56	

Table A5 - Granger causality test (VAR)

Equation	Excluded	chi2	df	Prob>chi2	
dlper	dlgdp	15.285	1	0.000	***
	ddese	10.043	1	0.002	***
	dlpop	0.0013	1	0.971	
	dkof	2.1607	1	0.142	
	ALL	15.694	4	0.003	***
dlgdp	dlper	0.01959	1	0.889	
	ddese	15.497	1	0.000	***
	dlpop	48.568	1	0.000	***
	dkof	7.8454	1	0.005	***
	ALL	73.437	4	0.000	***
ddese	dlper	1.447	1	0.229	
	dlgdp	3.5824	1	0.058	**
	dlpop	37.147	1	0.000	***
	dkof	0.34448	1	0.557	
	ALL	42.641	4	0.000	***
dlpop	dlper	2.6468	1	0.104	
	dlgdp	0.61308	1	0.434	
	ddese	9.5976	1	0.002	***
	dkof	0.00165	1	0.968	
	ALL	18.859	4	0.001	***
dkof	dlper	3.5181	1	0.061	**
	dlgdp	0.26658	1	0.606	
	ddese	0.00304	1	0.956	
	dlpop	8.3963	1	0.004	***
	ALL	10.607	4	0.031	***

Flow Summary

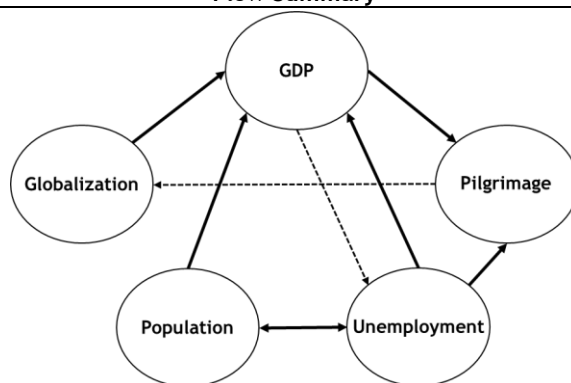


Table A6 - Test of normally distributed disturbances

Jarque-Bera				
Equation	chi2	df	Prob>chi2	
dlper	0.532	2	0.76631	
dlgdp	0.538	2	0.76433	
ddese	0.979	2	0.61291	
dlpop	0.191	2	0.90872	
dkof	0.095	2	0.95345	
ALL	2.336	10	0.99306	
Skewness				
Equation	Skewness	chi2	df	Prob>chi2
dlper	0.17208	0.094	1	0.75943
dlgdp	0.27275	0.236	1	0.62742
ddese	0.2555	0.207	1	0.64935
dlpop	-0.16339	0.085	1	0.77124
dkof	0.12613	0.05	1	0.82241
ALL		0.671	5	0.98452
Kurtosis				
Equation	Kurtosis	chi2	df	Prob>chi2
dlper	2.2557	0.439	1	0.50782
dlgdp	2.3824	0.302	1	0.58268
ddese	2.0123	0.772	1	0.37949
dlpop	3.3675	0.107	1	0.74369
dkof	3.2383	0.045	1	0.83206
ALL		1.665	5	0.89331

Table A7 -Correlation matrix (ARDL)

	lperpc	lchegpc	lservpc	lgdppc	dese
lperpc	1				
lchegpc	-0.7597	1			
lservpc	0.8418	-0.7749	1		
lgdppc	-0.7897	0.5443	-0.6291	1	
dese	-0.5813	0.7847	-0.7761	0.1838	1

Table A8 - Unit roots test (ARDL)

Variables	Level			First differences	
		ADF	PP	ADF	PP
lperpc	τ	-2.917357(0)	-2.968291(1)	-5.455746(3)***	-18.16498(18)***
	μ	-3.138767(0)*	-1.390673(6)	-4.314590(2)***	-7.141803(4)***
	n	0.599311(0)	1.381511(9)	-5.841189(0)***	-5.841189(0)***
lchegpc	τ	-0.698292(0)	-0.832593(1)	-3.638729(4)*	-4.000075(1)*
	μ	1.127002(0)	1.127002(0)	-3.775946(0)*	-3.776268(1)*
	n	-2.304574(0)*	-2.068042(2)*	-2.695500(0)**	-2.742813(2)**
lservpc	τ	-2.252493(0)	-2.458272(2)	-5.913222(0)***	-5.913222(0)***
	μ	-0.824767(0)	-0.824767(0)	-5.962083(0)***	-5.804446(1)***
	n	0.906391(0)	0.906391(0)	-5.307309(0)***	-5.133450(2)***
lgdppc	τ	-2.352686(0)	-2.418744(3)	-2.722583(0)	-2.597002(3)
	μ	-3.997212(0)**	-3.753792(1)*	-2.460197(0)	-2.371142(3)
	n	1.980237(0)	1.478204	-2.321083(0)*	-2.176449(4)*
dese	τ	-3.060262(1)	-2.026411(0)	-2.142796(0)	-2.142796(0)
	μ	-1.299554(1)	-0.715279	-2.291791(0)	-2.291791(0)
	n	-0.215225(1)	0.352549(2)	-2.339584(0)*	-2.369983(1)*

Notes: In () the numbers of lags; μ stands for Constant; τ stands for Constant and Trend; n denote none. ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Table A9 - Unit roots test (ARIMA)

Variables	ADF		
		Level	First differences
lvisitors	τ	-0.888874 (11)	-15.49616 (10) ***
	μ	-0.654079 (11)	-15.69157 (10) ***
lpilgrims	τ	-0.085232 (11)	-20.80575 (10) ***
	μ	0.358230 (12)	-20.59186 (10) ***

Notes: L means natural logarithms; ln () the numbers of lags; μ stands for Constant; τ stands for Constant and Trend. ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Table A10 - Unit roots test (daily data of the Sanctuary of Fatima)

Variables	Level			First differences	
		ADF	PP	ADF	PP
lvis	τ	-3.2577 (7) *	-11.7034 (11) ***	-8.1020 (13) ***	-69.4265 (34) ***
	μ	-3.2842 (7) *	-11.6015 (11) ***	-8.0331 (13) ***	-68.2032 (34) ***
txcd	τ	-3.4388 (0) *	-3.4388(0) *	-17.5831 (0) ***	-17.5412 (6) ***
	μ	-3.6275 (0) ***	-3.6565 (1) ***	-17.5633 (0) ***	-17.5247 (6) ***
lach	τ	-11.5360 (0) ***	-11.5531 (6) ***	-12.2378 (6) ***	-60.6546 (45) ***
	μ	-11.5518 (0) ***	-11.5679 (6) ***	-12.2532 (6) ***	-60.3282 (45) ***
ltemp	τ	-3.7440 (3) *	-5.5363 (0) ***	-16.8532 (2) ***	-37.4072 (35) ***
	μ	-3.8286 (3) ***	-4.7798 (4) ***	-16.81225 (2) ***	-32.2608 (33) ***
lce	τ	-2.6846 (14)	-14.8461 (83) ***	-5.6123 (13) ***	-31.9769 (30) ***
	μ	-2.6874 (14)*	-14.6517 (63) ***	-5.5844 (13) ***	-32.1528 (30) ***

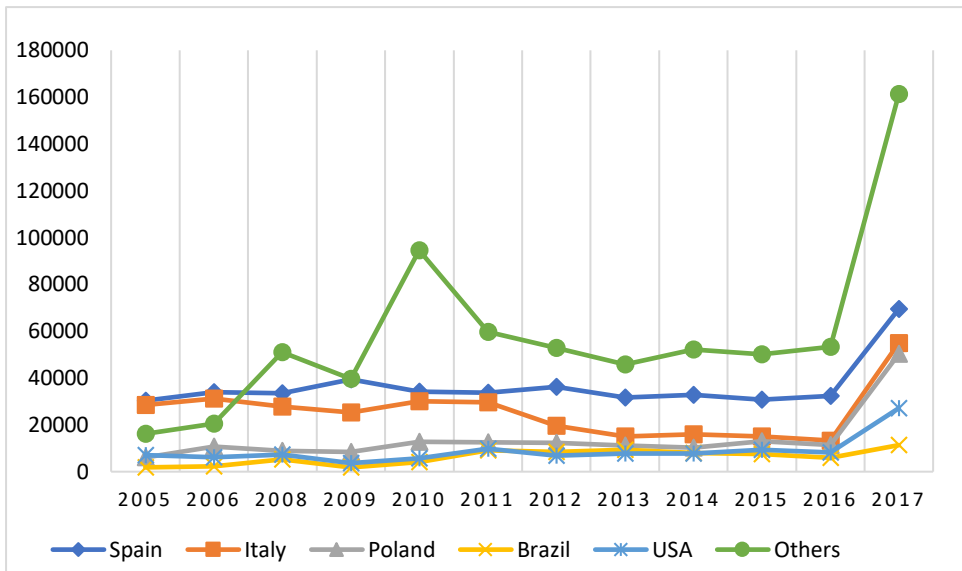
Notes: ln () the numbers of lags; μ stands for Constant; τ stands for Constant and Trend. ***, ** and * denote significance at 1%, 5% and 10%, respectively.

Table A11 - Matrix of correlations (Daily Data of the Sanctuary of Fatima)

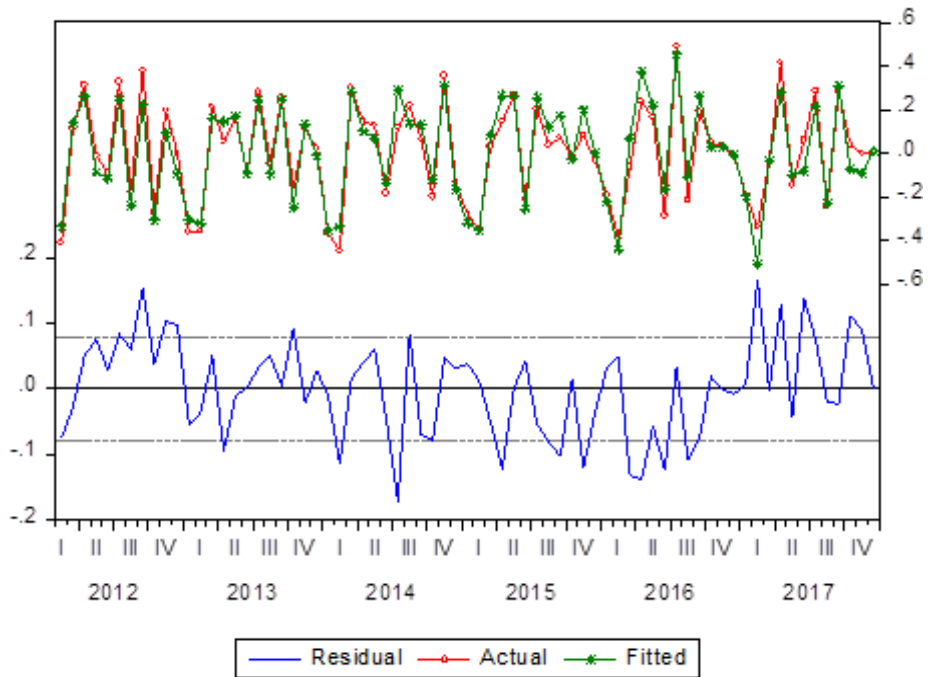
	lvis	lce	ltemp	lach	txcd
lvis	1.0000				
lce	-0.7292	1.0000			
ltemp	0.4175	-0.3905	1.0000		
lach	-0.1057	0.0757	-0.0460	1.0000	
txcd	0.0440	0.2453	-0.2472	0.1246	1.0000

Table A12 - VIF statistic (daily data of the Sanctuary of Fatima)

Variable	VIF	1/VIF
lce	1.22	0.822290
ltemp	1.21	0.823077
txcd	1.11	0.902058
lach	1.02	0.982310
Média VIF		1.14



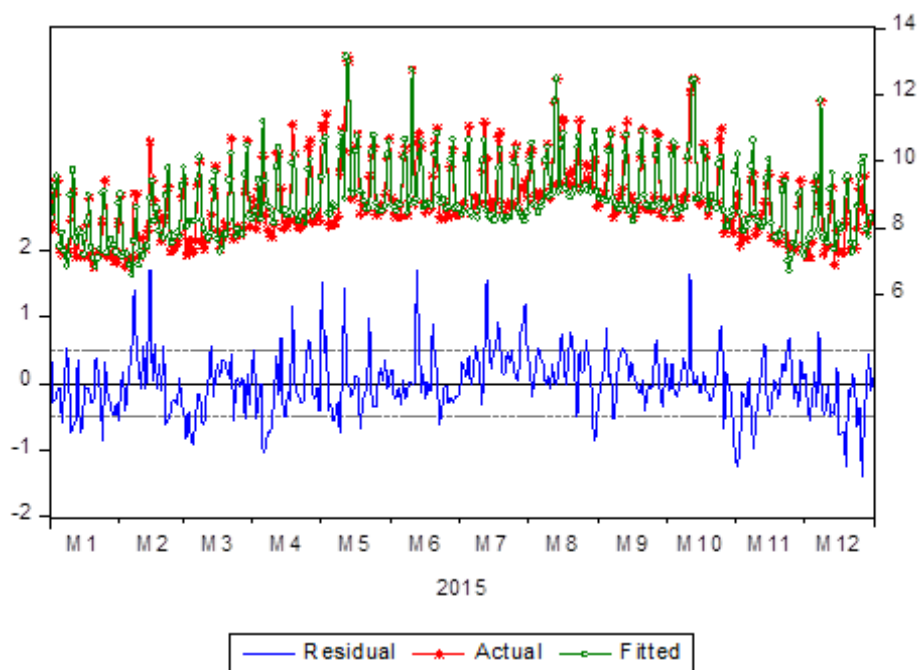
Graph A1 - International pilgrims in the Sanctuary of Fatima



Graph A2 - Resids (OLS regression - forecast for Aparecida)



Graph A3 - Resids (OLS regression - forecast for Fatima)



Graph A4 - Resids (OLS regression - visitants)