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Socioeconomic Determinants of Pilgrimages: A Var Approach to the Portuguese Case of Fatima

Determinantes Socioeconómicos das Peregrinações: Uma Abordagem Var do Caso Português de Fátima

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Abstract/ Resumo

This study examines the phenomenon of pilgrimages to the Shrine of Fatima from the perspective of the economic sciences. Through an economic model, it seeks to establish the relationship between Catholic religious tourism and the Portuguese economic reality in the short-run. An Autoregressive Vector model with annual data from 1994 to 2018 found endogeneity for the model. Thus, the relationships between a number of economic variables (Gross Domestic Product, unemployment rate, population, index of informational globalisation) and the phenomenon of pilgrimages were confirmed by the model. The results show that relationships between a number of economic variables (Gross

Este estudo analisa o fenómeno das peregrinações ao Santuário de Fátima sob a ótica da ciência económica. Através de um modelo econométrico procurou estabelecer a relação entre o turismo religioso católico e a realidade económica portuguesa no curto prazo. Recorrendo a um modelo Vectorial Autoregressivo e ao uso de dados anuais de 1994 a 2018, foi detetada endogeneidade no modelo. Foram testadas as relações entre as variáveis económicas (Produto Interno Bruto, taxa de desemprego, população, índice de globalização informational) e o fenómeno das peregrinações. Os resultados revelam que o desemprego e o Produto Interno Bruto têm uma relação unidirecional com o fenómeno

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Domestic Product, unemployment rate, population, index of informational globalisation) and the phenomenon of pilgrimages were confirmed by the model. The results show that unemployment and Gross Domestic Product are unidirectionally related to the religious phenomenon. Besides, there is a bivariate relationship between pilgrimages and the rate of globalisation. Finally, the results suggest that the relationship between population and pilgrimage exists thanks to common factors that drive both phenomena. These results provide policymakers with a theoretical basis for decision-making assistance, improving the conditions for the creation of projects that favour the local economy and pilgrims. The study also contributes to the literature because it analyses the Marian phenomenon from the perspective of economic science.

Keywords: Economics of religion; Religious tourism; Pilgrimage; Shrine of Fatima; Autoregressive vector.

JEL Codes: Z39; Z12; C13

religioso, bem como uma relação bidirecional entre as peregrinações e o indice de globalização. Os resultados suportam que a relação entre a população e a peregrinação existe devido a fatores comuns a ambas as variáveis. Com base nesses resultados, os decisores responsaveis pela implementação de políticas económicas têm uma base teórica para os auxiliar na tomada de decisão, nomeadamente incrementando as condições para a realização de projetos que favoreçam a economia local e os peregrinos. Esta investigação contribui para a literatura ao analisar o fenómeno mariano sob a ótica das ciências economicas.

Palavras-chave: Economia da religião; Turismo Religioso; Peregrinação; Santuário de Fátima; Vector Autorregressivo.

Código JEL: Z39; Z12; C13

1. INTRODUTION

Would the city of Fatima (Portugal) stand out as it stands today, without the Marian phenomenon? It is known that, since May 13, 1917, the city underwent several structural changes, in addition to housing many important works (architectural and of art). Today the city receives millions of people per year, in large part because of the renowned Shrine dedicated to Mary, the Shrine of Our Lady of the Rosary of Fatima.

National authorities tend to make decisions that benefit their countries. According to Aydin (2016), it is common to find authorities guiding their economies to receive more revenues from tourism. Like any tourist, pilgrims also have necessities of consumption. The decision to make a pilgrimage can directly impact the various economies along the way, whether the journey is carried out on foot (a common practice) or done with the help of some means of transportation. The destination city is the one that receives the greatest impact by the number of people who transit annually.

The scarcity of studies that relate economic variables to pilgrimages raises several questions about the behaviour of pilgrims when faith is not the only motivating factor for pilgrimages. So, the research's question is as follows. Is the economic reality related to the number of people who visit the Shrine of Fatima?

The economic variables capture phenomena that are directly linked with pilgrims and that can provide interesting aspects for the debate about the religious phenomenon, its motivation and the economic relation of the phenomenon. Thus, contributing to the literature of pilgrimages and religious tourism, from the perspective of the economic sciences.

In 2017, the Shrine of Fatima registered almost one million pilgrims, the second-best number recorded, because in this year the Shrine celebrated several festivities and received the papal visit. For this reason, the purpose of this article is twofold. On the one hand, to verify the existence of a causal relationship between economic variables (Gross Domestic Product, population, unemployment and globalisation) and the number of pilgrims who travelled to the Shrine of Fatima, using a Vector Autoregressive (VAR) econometric model. The empirical results serve as the basis for the

discussion of the phenomenon of pilgrimages and their economic interaction. The time horizon comprises annual data from 1994 to 2018.

Our research hypotheses were inspired by both several studies and by economic theory: Mourão (2012) found that changes in the labour market (socioeconomic improvement) induce future changes in perceived (and published) graces in two Portuguese Catholic bulletins. Alegre (2013) show that unemployment and a higher risk of job loss lower significantly tourism participation and expenditure in Spain. Therefore, hypothesis 1, is to confirm the short-run statistical relationship between unemployment and Gross Domestic Product and pilgrimages to the Fatima Shrine.

Fuinhas et al., (2017) predicted the number of pilgrims to the Shrine of Fatima. The authors used the only data available (a variable that aggregates Portuguese and international pilgrims). This study, the number of pilgrims is also aggregated. Therefore, the second hypothesis is to verify if there is a relationship between Portuguese population growth and pilgrimages. Finally, the last hypothesis was advanced based on the analysis of Alves (2011). This author discusses culture, heritage, identity (and others) in tourism research, and highlights that issues like these are answers to the dynamics of globalisation in the face of fear of loss of cultural roots (e.g. beliefs and traditions). Therefore, the third hypothesis is to check whether there is endogeneity between globalisation and pilgrimages.

These results favour the managers of the Shrine of Fatima. First, because they capture an essential relation of the profane (economics variables) that relates and can influence the search for the sacred. The results generate empirical bases to approach the Marian phenomenon of religious tourism in Portugal. Besides motivating the elaboration of new studies, these results will serve to compare to other shrines and report more economic determinants and effects of the phenomenon of faith.

This article is organised as follows. The second section presents the literature review, addressing the main issues debated on the subject. The third section describes the mathematical method, the data used and clarifies its capabilities and limitations. The empirical results and discussions will be presented in the sequence (section 4). The article concludes by presenting the conclusions and suggesting some management and policy measures based on the results.

2. LITERATURE REVIEW

Throughout the world, there are hundreds of sanctuaries and temples, sacred sites, where believers (not believers) seek (or not) to commune with the sacred. The historical, cultural and artistic wealth of some of these places attract tourists, researchers and students from various areas, often without relating the religious value of the place or works. In the sequence, we show the links between economics and religion, economy and tourism religious, pilgrimage, and the implications for the cities and peoples.

2.1 Economics and religion

Iannaccone (1998) shows how slowly the economy of religion has been developing. The first and second publication in the area were separated by two centuries (Iannaccone, 1998). The concept of the economics of religion has been one of the most useful contributions of rational choice theories to the sociology of religion (Bankston III, 2002). The approach treats religious environments as economies in which religions and religious groups are companies competing for customers who make rational choices among available products (Bankston III, 2002).

There is an understanding that the economic prosperity of some regions (during the twentieth century) was attributed to the Protestant religion (e.g. Weber, 2013). Becker & Woessmann (2009) collaborate in the debate by providing an alternative theory in which human capital is crucial to economic prosperity. That is, economic prosperity related to the better education of Protestants because they practised reading using the Bible. Meanwhile, Catholic missionaries sought out the remote regions and collaborated for local infrastructure respect the mission given by Jesus Christ was: “Go into all the world and preach the gospel to every creature” (Mk 16:15, *Bíblia de Jerusalém*).

Linck (2005), for example, discusses some interesting historical aspects of the American Catholic church, and the plantation founded by the Jesuits (in Cecil County, Maryland). This plantation was essential because it provided the

basis for missionary endeavours in the region and colony of Pennsylvania. Another example is Grover (1993) that shows the importance of working in education in colonial Brazil and throughout Latin America, as well as to the development of libraries in this region.

Iannaccone (1998) still reflects on how studies of religion promise to improve the economy. The author proposes that economic models can be modified to address questions about belief, norms and values; and exploring how religion (and, by extension, morality and culture) affect economic attitudes and activities of individuals, groups, and societies (Iannaccone, 1998).

2.2 Economics and tourism religious

Tourist destinations, in general, seek smart specialisation, that is, the adoption of a strategy to support socio-economic development based on the identification of regional vocational areas and industries and the promotion of local business development (Del Vecchio & Passiante, 2017). The concept of tourism is generally linked to development and encompasses a growing number of new destinations (World Tourism Barometer, 2016). Moaven et al. (2017) state that religious tourism is a large part of the globalisation process. In the Catholic context, this type of tourism has become another agent responsible for boosting the local economy (e.g. Fatima in Portugal, Aparecida in Brazil, Lourdes in France, among others), generating demand that need to be met by the market.

In the table below, we show a summary of the literature on religious tourism (Table 1). Nonetheless, it is essential to remember that every pilgrim is a religious tourist. But not all religious tourists are pilgrims (Bauman, 1998). They are different because the pilgrim is facing its interior nature, for purposes of reflection. The tourist focuses on the outside (e.g. works of art and architecture) fleeting activities. So, it is often complex to separate them into classes.

Table 1 – Chronological literature on religious tourism

Authors	Highlights
Moufahim & Lichrou (2019)	Consumption enables the materialisation of the experience and acts as a vector of various rituals.
Belucio & Fuinhas (2019)	Weather factors and exchange rate impact number of pilgrims in Shrine of Fatima (Portugal).
Collins-Kreiner (2018)	Pilgrimages have powerful political, economic, social, and cultural implications, and can even affect global trade and health.
Graave (2017)	This economic impact is relevant to policymakers and other stakeholders dealing with religious tourism in Galicia.
Aulet (2017)	Monasteries attract religious tourists but tailoring the types of tourism can bring sustainability to the regional economy; 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.
Fuinhas et al. (2017)	They found seasonality in the Marian religious tourism and indicates political measures to deal with the problem.
Hung et al. (2017)	The commercialisation of sacred places may contradict the values and philosophies of Buddhism. The study aims to understand the balance between marketing and holiness comprehensively. Based on the results of the study, a balanced model of religious tourism development is suggested.
Chadha & Onkar (2016)	The tourism industry in this decade has brought many changes to Indian cities, diversified social and cultural identity and generated opportunities for economic development.
Fedele (2014)	Their approach to sacred sites is by no means unique but rather the expression of engagement both with pilgrimage and tourism; Energy and transformation are critical common elements of alternative pilgrimages to Catholic shrines but also of sacred journeys to historical or archaeological sites described as power places.
Vijayanand (2014)	Pilgrimage tourism is the type of tourism that entirely or powerfully motivates tourists for the achievement of religious attitude and practices.
Saayman, (2014)	Their research contributes to the literature on the economics of pilgrimages and understanding pilgrims' spending behaviour, especially in the African context.
Vukonic, B. (2002)	Explains and supports the idea that the economic impacts of religious tourism should not be neglected or underestimated

Author's elaboration.

The relationship between economics and religious tourism has been warming the debate about the various possibilities for sanctuary-cities. Among the hot topics, could be nomi-

nated the diversification of tourism in the region (Chadha & Onkar, 2016), or sub-diversification (Fuinhas et al., 2017). They still draw the attention of public policymakers and other stakeholders involved in religious tourism to the theme and its needs (e.g. Aulet et al. 2017; Graave et al., 2017; Fuinhas et al., 2017).

2.3 Pilgrimage

Pilgrimage is one of the oldest forms of tourism (Štefko et al., 2015), and one of the cultural and religious phenomena most common to human society (Collins-Kreiner, 2010). It can be performed individually or in groups and has a specific and sacred purpose (Coleman, 2015).

Most places of worship are unknown worldwide. However, there are several temples/sanctuaries with "international prominence", which are known as tourist spots because of their physical and cultural greatness among religious practitioners and a substantial part of the world population.

For hundreds of years, trips undertaken for religious motivations are present throughout human history. For example, it is from the land of the Pharaohs that the great pilgrimage of the Hebrew people has taken place (Pontifical Council for the Pastoral Care of Migrants and Itinerant, 1998). This exodus took place around 1250 BC when the people wandered in search of the land promised by their God, Iahweh[1] (De 8:7-10). The same God who had previously indicated to Abram: “Leave your country, your kindred, and your father's household, and go to the land I will show you” (Ge 12:1) is, we guess, the first pilgrimage motivated by faith that has been reported by history.

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 (*Pessach*). The search for the atonement of one’s 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 AC 628 (After Christ), the encounter with the Christian memories of the Holy Land became more arduous, and new itineraries of pilgrimage were opened in the West. Nowadays, Jerusalem continues to be visited by groups of pilgrims (e.g. Catholics, Protestants and Jews).

2.4 Pilgrimage implications for the cities and peoples

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 Passover, their roads were reformed, and the artesian wells restored, in order to guarantee the maximum comfort of the pilgrims. Collins-Kreiner (2010) highlights several implications of pilgrimages, namely political, economic, social, cultural and health.

However, Chadha & Onkar (2016) warn that after studying the Case of Allahabad, cities with tourism potential are facing urban planning problems. The authors stress that decades are necessary for urban planners and designers to be prepared for the changes in a tourist city. Well thought public policies collaborate for the maintenance and economic local development. That is why tourism planners must understand the phenomenon, characteristics and desires of the participants (Collins-Kreiner, 2010).

In short, the phenomenon of pilgrimages is not a recent one. Moreover, it is highly motivated by doctrinal, ritualistic and psychological factors. Over the centuries, it has become essential in various cities and creeds around the world. In cities where Marian sanctuaries were built, religious tourism has become indispensable to the local economy.

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. However, Van Ingen & Moor (2015) point out that the frequency in religious services has been in a marked decline in the West, but there is a country-specific variation, so attention must be paid to each specific case.

Colwell-Chanthaphonh & de Salle-Essoo (2014) expose how the inhabitants of the Mauritian islands and their diverse cultural and religious bases interact. Besides that, they show the various sanctuaries (oratorios) as intercultural places, because they do not require explicit justification or rationalisation

[1] Iahweh (or others variations) means the name of God which is for the unpronounceable Hebrews.

(Colwell-Chanthaphonh & de Salle-Essoo, 2014). On the other hand, Sells (2003) deals with the dual role of religion in the war in Bosnia and Herzegovina. It also shows that their religious traditions identified the victims. Besides that, religious manifestations were seen as incidental to deeper social, political and economic issues (Sells, 2003).

Since the frequency of religious rites is an evident measure of the level of religiosity in each 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. For example, Samson et al., (2015) looking at ways in which a (Polish) breast cancer support group uses religious symbols and practices (including the pilgrimage to the Black Madonna of Częstochowa) to achieve its goal of providing emotional support to women at different stages of the disease.

3. METHODOLOGY AND DATA

This section presents the data and methodology used to analyse the phenomenon of pilgrimages and find their economic determinants and effects. It was decided to use econometric methods (mathematical tool) to study the phenomenon and to establish empirical results.

3.1 Econometric methods

From the VAR model proposed by Sims (1980) to be applied in economic studies, multivariate data analysis in the context of VAR models evolved as a standard instrument in econometrics (Pfaff, 2008). In the economics literature, several authors applied the VAR and its variations (Danish et al., 2018; Koengkan, 2018; Marques & Fuinhas, 2015; Pradhan & Bagchi, 2013; Love & Zicchino, 2006). The model allows the observation of the short-run causal relationship between the variables.

Time series models have some conditions that should be assured for the estimation to be valid. In accordance, several diagnostic tests were performed. The Variance Inflation Factors (VIF) checks multicollinearity and has a benchmark limit of less than 10. The ADF (Augmented Dickey-Fuller) and PP (Phillips Perron) tests are the most common to detect the presence of unit roots, or nonstationary variables. They have as a null hypothesis the presence of unit root. Rejecting the null hypothesis is accepted the stationary tendency or stationarity. The KPSS (Kwiatkowski-Phillips-Schmidt-Shin) also test checks stationarity. Finally, the lag order selection test indicates the ideal number of lags in the VAR estimation.

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

$$Y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + u_t \quad (1)$$

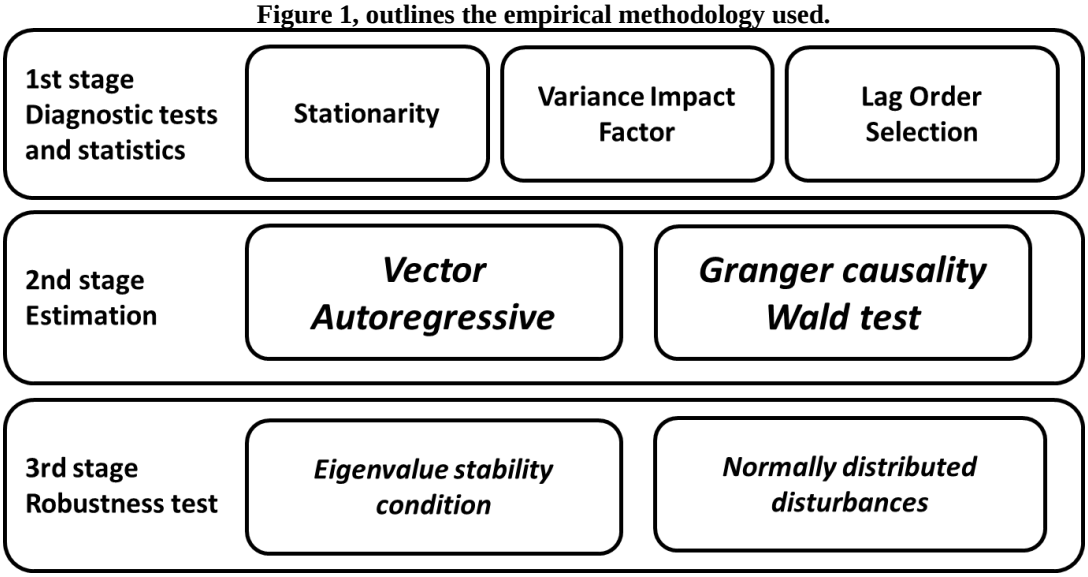
where: Y_t are the endogenous variables; A_1 are coefficient matrices (k x k) for i=1,..., p; and u_t is a vector of white noise residuals.

The Granger Causality Wald test shows the causal relationship between the variables and the statistical significance level of 1%, 5% and 10%, respectively. In the highly endogenous model, results of 1% significance are expected. The test can support neutral relationships, unidirectional relationship or bidirectional relationships.

It is common to perform robustness tests after the estimation of an econometric model. In this article, we present the tests of Wald lag-exclusion, eigenvalue stability condition, and normally distributed disturbances.

The Wald lag-exclusion statistic performs lag exclusion tests. That is, it reveals the optimal number of lags required for the VAR. The eigenvalue stability condition and the graphical demonstration allow verifying the stability of the estimated model. The test for normally distributed disturbances presents three statistics of normality: (i) Jarque-Bera; (ii) Skewness; and (iii) Kurtosis.

Figure 1, outlines the empirical methodology used.



Scheme of the empirical methodology
Author's elaboration.

3.2 Data

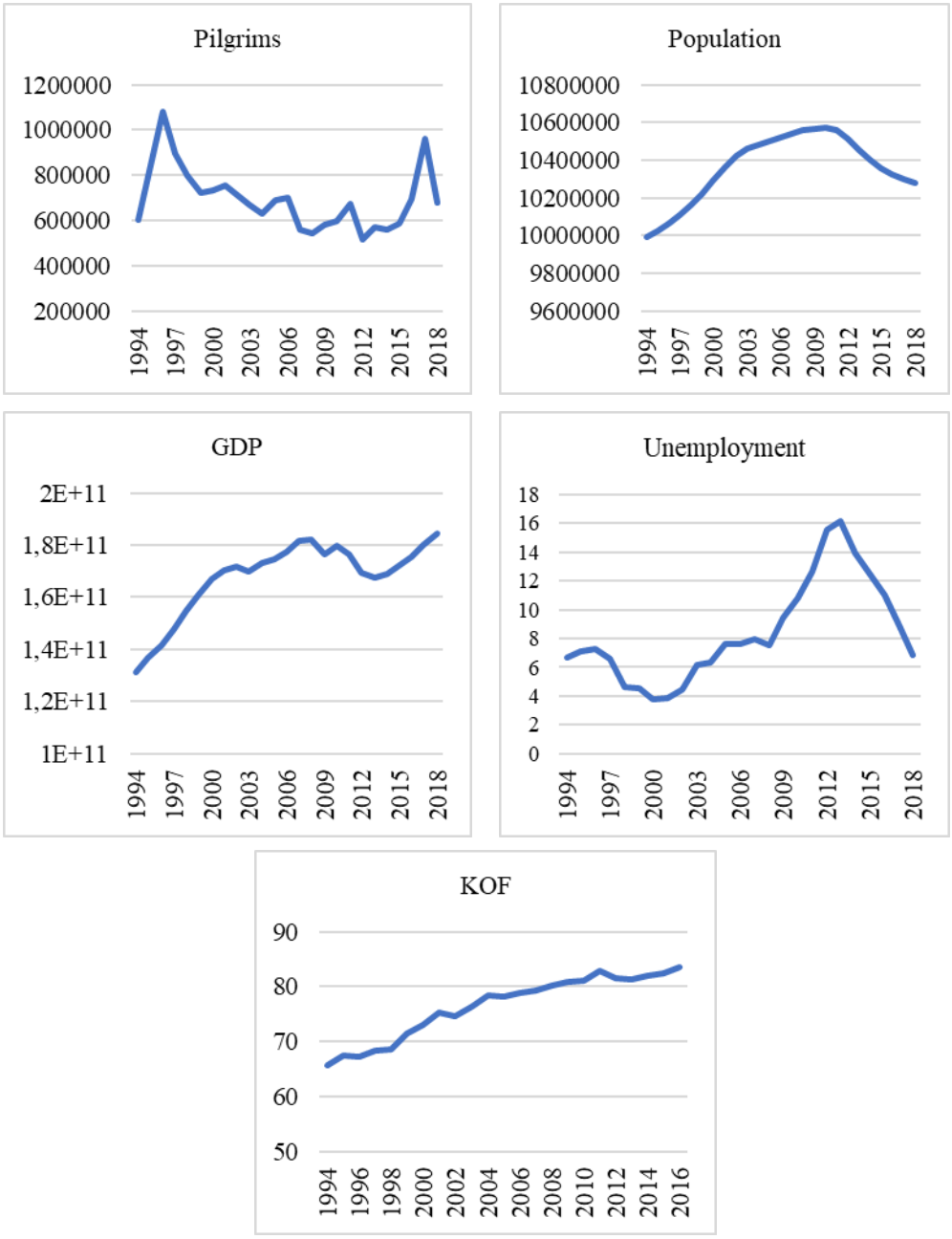
The number of official pilgrims of the Shrine of Our Lady of the Rosary of Fatima is counted through the various agents that are part of the structure of the shrine, namely Pilgrims Service of the Sanctuary and Service of Promotion and Preservation of the Environment. To ensure the consistency of the information used in this article, we obtained statistical information through the Service of Studies and Diffusion (another organ) of the Sanctuary. The variable "pilgrims" includes the number of Portuguese and foreign pilgrims. We recall that pilgrims accounted for by the Shrine is not the overall number of religious tourists only those, who attend liturgical celebrations or sign up like pilgrims (e.g. Fuinhas et al., 2017). Only recently has the Shrine distinguished between national and international pilgrims. Which makes it impossible to use only the number of Portuguese pilgrims in the study. For example, in 2018 the total number of pilgrims was almost 700,000, just under 20% were international pilgrims (Shrine of Fatima, 2019).

The Gross Domestic Product (GDP), population, and unemployment were obtained from the WorldBank database. The World Development Indicators (WDI) is the primary World Bank collection of development indicators, compiled from officially recognised international sources. For more statistical information about Portugal see WorldBank (2019). The GDP variable was used in Constant Local Currency Units, a common practice in the economic sciences (e.g. Belucio et al., 2019; Fuinhas, Marques & Lopes, 2019).

To measure unemployment, we use unemployment in % of the total labour force, and the population in its total value, i.e. the number of persons able to participate in the process of the social division of labour (active population). Globalisation began with a general term characterised for information exchange. As a measure for the Portuguese globalisation, we used the statistical data of the Information Globalisation Index provided by Kof Swiss Economic Institute the index can range from 0 to 100. The value 100 was attributed to the most globalised countries, and the value 0 was attributed to the least globalised countries. Statistical information on the globalization variable is limited. In the time horizon of the study the available period is 23 year, while the other variables have 25 years of data.

When using econometric methods to understand only one city, region or country (as is the case), the number of statistical information is of great importance. In the time-series literature, the more years, the better the estimation and the reliability of the results. Our data comprise annual information from 1994 to 2018. For the VAR estimation, more than 20 years is a reasonable number of observations. In figure 2, we graphically present the behaviour of the variables.

Figure 2: Variables



Author's elaboration.

Graphical analysis suggests that the variables are of a different order of integration. There is a break at the time of the Subprime Crisis, but visible in unemployment, GDP and population. However, the series does not show high volatility. Table 3, below, presents the descriptive statistics of variables.

In Table 3, data are presented for the years of statistical information. The mean, standard deviation, minimum and maximum are also presented. Due to the nature of the variables, the KOF index and unemployment were not transformed. The prefix "l" denotes that the variables were in natural logarithmic.

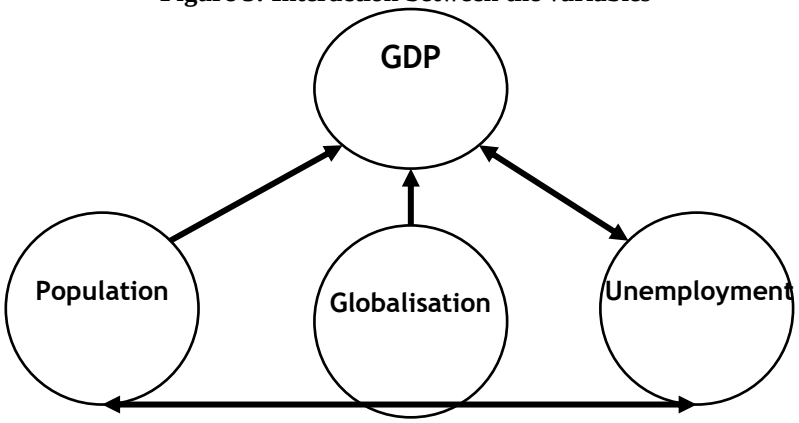
In the short-run, it is expected that GDP will not influence the population. The economic stability of the country and families can reflect positively in the attraction of immigrants and the increase of the birth rate, but they require time. However, even in the short-run, GDP can be an economic factor that influences pilgrim demands to the Shrine, in a kind of "thanks" or "supplication" for example, employment or better financial condition (see Figure 3).

Table 3 – Description of the data

Variables		**Acronyms**			
Pilgrims		pil			
Gross Domestic Product		gdp			
Population total		pop			
Unemployment total		un			
Information globalisation index		kof			
Descriptive statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
lpir	25	13.4329	0.185544	13.15367	13.89109
lgdp	25	25.84183	0.091349	25.60039	25.93972
lpop	25	16.1535	0.017554	16.11725	16.17382
un	25	8.39696	3.531209	3.809	16.183
kof	23	76.48734	5.77192	65.64501	83.49472

Author's elaboration.

Figure 3: Interaction between the variables



Author's elaboration.

Figure 3 reveals that the relationship between GDP and unemployment is present in the short- as well in the long-run, confirming that variables are strongly linked over time. A comprehensive approach to the economic relationship of this variable could be seen in Pinho & Pinho (2015). These authors studied the Portuguese case both at the national and regional level. Similarly, unemployment is probably a motivator of the pilgrimages. While globalisation is used as a "control variable", it seeks to capture the effect of the densification of globalisation in explaining the phenomena under study from the perspective of the economic science. The literature shows that it is common to use this one of the variables interacting with each other, for example: GDP and Globalisation (e.g. Fuinhas et al., 2019; Marques2017); population and GDP (e.g. Krausmann et al., 2009); unemployment and GDP (e.g. Hashim, , 2019).

The three previously mentioned tests (KPSS, ADF and PP) were used to confirm the stationary character of the series (details in table 4), using the Bartlett and Newey-West Bandwidth spectral estimation method and the Schwartz information criterion. The results suggest stationarity in first differences, revealing that all variables are stationary in at least one of the possibilities tested, level or first differences, and in the presence of a trend and constant, only a constant or none).

In this way, the diagnostic checks were continued. The variables were transformed into the first differences, as suggested by the unit root and stationary tests. In table 5, the results of the VIF statistic can be observed.

Table 4 – Stationarity tests

		In level			In first differences		
		KPSS	**ADF**	**PP**	**KPSS**	**ADF**	**PP**
lpil	τ	0.153866(1)**	-2.994181(0)	-3.124492(1)	0.128367(4)*	-4.708592(0)***	-7.160013(13)***
	μ	0.382682(2)*	-2.416836(0)	-2.416836(0)	0.150192(5)	-4.771646(0)***	-5.369392(7)***
	n	n.a.	0.117285(0)	0.195855(5)	n.a.	-4.954070(0)***	-5.567325(7)***
lgdp	τ	0.169549(3)**	-2.481033(1)	-2.474373(2)	0.151430(2)**	-2.435054(0)	-2.361320(2)
	μ	0.521986(3)**	-2.469003(1)	-3.467423(2)**	0.339939(3)	-2.460394(0)	-2.399785(3)
	n	n.a.	1.062331(1)	1.919922(3)	n.a.	-2.220895(0)**	-2.131114(4)**
lpop	τ	0.192164(3)**	-0.400151(2)	0.119945(2)	0.095151(3)	-4.180930(1)**	-2.099085(2)
	μ	0.383322(3)*	-2.762856(3)*	-2.139271(3)	0.575457(3)**	-0.894817(2)	-0.880354(2)
	n	n.a.	-0.608746(3)	0.796746(3)	n.a.	-1.254635(2)	-1.077751(2)
un	τ	0.093579(3)	-2.071984(1)	-1.322884(2)	0.150333(2)*	-2.054525(0)	-2.043627(1)
	μ	0.436839(3)*	-1.826534(1)	-1.326327(2)	0.167980(2)	-2.032433(0)	-2.030873(1)
	n	n.a.	-0.935142(1)	-0.499930(2)	n.a.	-2.101163(0)**	-2.105094(1)**
kof	τ	0.172570(3)**	-1.457955(0)	-1.457955(0)	0.088836(3)	-5.999311(0)***	-6.082376(2)***
	μ	0.650570(3)**	-1.732907(1)	-2.304693(3)	0.262952(0)	-5.613750(0)***	-5.574906(1)***
	n	n.a.	3.314210(0)	3.684129(1)	n.a.	-3.820387(0)***	-3.870726(2)***

Notes: In () lags numbers; l means natural logarithm; *n* means none; μ stands for constant; τ means constant and tendency; ***, ** and * denote significance at 1%, 5% e 10% level, respectively; n.a. denotes *not available*.
Author's elaboration

Table 5 – VIF statistic

Variable	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
dlpil	n.a.	n.a.	2.20	0.454092	2.37	0.422419	2.04	0.489859	2.22	0.449580
dlgdp	26.98	0.037064	n.a.	n.a.	10.43	0.095904	15.70	0.063684	8.99	0.111204
dun	7.67	0.130376	2.76	0.362643	n.a.	n.a.	7.04	0.141997	1.52	0.658350
dlpop	9.88	0.101214	6.20	0.161208	10.52	0.095059	n.a.	n.a.	10.94	0.091397
dkof	26.95	0.037106	8.89	0.112445	5.68	0.176050	27.39	0.036509	n.a.	n.a.
Mean VIF	**17.87**		**5.01**		**7.25**		**13.04**		**5.92**	

Notes: n.a. denotes *not available*
Author's elaboration.

The results of the VIF statistics revealed to be valid (the values of the mean VIF should be below 10). Indeed, there are no problems with multicollinearity, being the best model what presents the average 5.01. As the econometric prerequisites were met, the selection of the lags of the estimation was made, the Stata *varsoc* option was used with a maximum of 2 lags. The results can be seen in table 6.

Table 6 - Lag order selection on estimation

lags	**LL**	**LR**	**df**	**p**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	101.006				4.70E-11	-9.60057	-9.55198	-9.35164
1	153.825	105.64	25	0.000	3.2e-12*	-12.3825	-12.0909	-10.8889*
2	183.918	60.187*	25	0.000	3.40E-12	-12.8918*	-12.3573*	-10.1536

Notes: LR means Likelihood Ratio, FPE (Final Error of Prediction), AIC (Akaike Information Criterion), HQIC (Hanna and Quinn Information Criterion) and the SBIC (Schwarz Bayesian Criterion). "*" indicates the significance of the test.
Author's elaboration.

The test of lag order indicated the ideal number of 2 lags for the model. This result can be observed through the AIC and HQIC, where the lowest value is found and highlighted with the "*".

4. RESULTS AND DISCUSSION

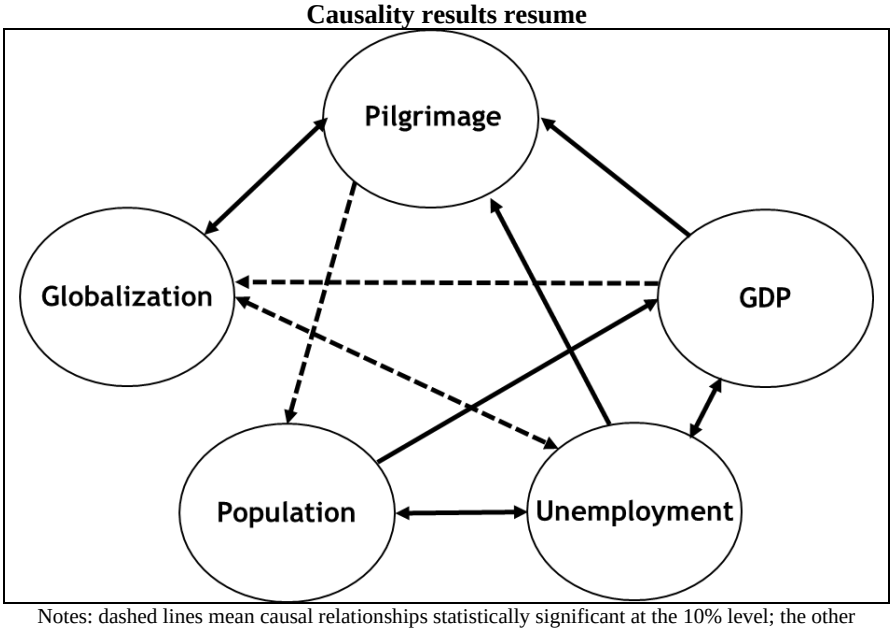
The results presented in this section consider the initial information suggested in the pre-tests performed earlier. In Table 7, it was

chosen to present the general outputs of the Granger causality test, that is, the least parsimonious model. This test indicated the causal relationship between the variables, being presented the relations of the explanatory and control variables. A summary of the Granger causalities is presented at the end of the table. Only statistically significant relationships are shown to facilitate the understanding of causal relationships.

Table 7 – Granger causality results

Equation	Excluded	chi2	df	Prob>chi2
dlpil	dlgdp	20.998	1	0.000
	dlpop	0.7926	1	0.373
	dkofin	9.5355	1	0.002
	ddese	19.553	1	0.000
	ALL	32.903	4	0.000
dlgdp	dlpil	0.05255	1	0.819
	dlpop	30.098	1	0.000
	dkofin	1.6795	1	0.195
	ddese	21.428	1	0.000
	ALL	71.174	4	0.000
dlpop	dlpil	2.7308	1	0.098
	dlgdp	0.4856	1	0.486
	dkofin	0.02586	1	0.872
	ddese	12.45	1	0.000
	ALL	27.405	4	0.000
dkofin	dlpil	3.8936	1	0.048
	dlgdp	3.7705	1	0.052
	dlpop	1.2065	1	0.272
	ddese	3.0402	1	0.081
	ALL	9.1106	4	0.058
ddese	dlpil	0.86811	1	0.351
	dlgdp	5.1053	1	0.024
	dlpop	36.038	1	0.000
	dkofin	3.0328	1	0.082
	ALL	59.917	4	0.000

Causality results resume



Notes: dashed lines mean causal relationships statistically significant at the 10% level; the other relations have a causality statistically significant at 1% or 5% level.
Author's elaboration.

The model is endogenous, its statistical probability is 1%, except in the globalisation variable that is endogenous in the 10% model. The trend was used as an exogenous variable, as suggested by the pre-tests of stationarity.

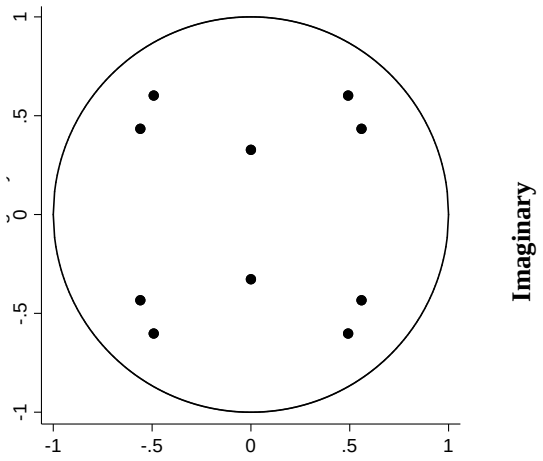
The causal relations accepted statistically are unemployment and GDP cause pilgrimages at 1%, this being a unidirectional relationship. Pilgrimages have a bidirectional relationship with globalisation at 1% and 5%. The control variable (population) showed a bidirectional rela- tionship with unemployment and revealed a unidirectional relationship with GDP.

4.1 Robustness empirical

Robustness tests were applied to the model. A well-estimated VAR model presents stability. It is important to remember that in the time series literature stability is a stationary condition (e.g. Lütkepohl, 2005). Our results are within what was expected, i.e., the model is stable (see the details in table 8).

Table 8 – Eigenvalue Stability Teste Stability Eigenvalue

Roots of the companion matrix



- Eigenvalue			Modulus
-0.4917894	+	.6020171i	0.777355
-0.4917894	-	.6020171i	0.777355
0.4917894	+	.6020171i	0.777355
0.4917894	-	.6020171i	0.777355
-0.5595531	+	.4337214i	0.707965
-0.5595531	-	.4337214i	0.707965
0.5595531	+	.4337214i	0.707965
0.5595531	-	.4337214i	0.707965
-7.65E-18	+	.3274403i	0.32744
-7.65E-18	-	.3274403i	0.32744

Author's elaboration.

The normality statistics were tested, the results of Jarque-Bera, Skewness and Kurtosis confirmed the normality of residuals (see the details in table 9).

Table 9 - Test of normally distributed disturbances

Jarque-Bera				
Equation	chi2	df	Prob>chi2	
dlpil	0.391	2	0.82261	
dlgdp	0.657	2	0.7199	
dun	0.653	2	0.72151	
dlpop	0.259	2	0.87843	
dkof	0.35	2	0.83934	
ALL	2.31	10	0.99336	
Skewness				
Equation	Skewness	chi2	df	Prob>chi2
dlpil	0.16613	0.092	1	0.76166
dlgdp	0.13058	0.057	1	0.81157
dun	-0.0157	0.001	1	0.97714
dlpop	-0.24198	0.195	1	0.65864
dkof	-0.32406	0.35	1	0.55408
ALL		0.695	5	0.98325
Kurtosis				
Equation	Kurtosis	chi2	df	Prob>chi2
dlpil	2.4015	0.299	1	0.58479
dlgdp	2.1512	0.600	1	0.43841
dun	2.1155	0.652	1	0.4194
dlpop	3.2773	0.064	1	0.80019
dkof	3.0166	0.000	1	0.98792
ALL		1.615	5	0.89939

Author's elaboration.

The robustness tests confirmed that the VAR estimation has the statistical properties necessary to validate the results.

4.2 Discussion

The results reinforce that the effect of unemployment is related to pilgrimages. This fact complements the result found by Mourao (2012) about the perceived grace, i.e. it is the result of the grace requested. From this reflection, a new question is put to debate. Are the health and physical well-being determinants of pilgrimages to the Fatima Shrine? This issue conforms to a case study applied by Samson et al. (2015).

The results indicate that there is a relationship between pilgrimages and economic variables (Kato & Progano, 2017; Liutikas, 2017). That is, in addition to the common factors that determine: miracles (Higgins & Hamilton, 2016), historical (Štefko, 2015) and income (Shuo et al., 2009). There is an influence of the economic variables in the decision process of the pilgrims. This result corroborates the findings of Fuinhas et al. (2017), that were concerned with the understanding of the phenomenon of pilgrimages as a source of local development. Also, the research in the area of tourism reveals that income can influence the decision of the tourist (Alegre et al., 2013).

The pilgrimage has a human/divine relationship that goes far beyond the choices dictated by the analyses of one-dimensional losses and gains. So, that relationships that seem to manifest empirically may be conditional. Given this limitation of the study, it is essential to identify variables that express other realities that induce the human being to practice pilgrimage. Therefore, it is essential to work together with the areas of tourism, sociology, psychology, anthropology and religion to better understand the phenomenon.

The importance of the religious tourist to the city-sanctuary region is well-known. The consumption of goods and services warms the local economy, attracts public and private investment, and benefits from the state with tax collection to companies that operate the hotel sector, catering and the sanctuary itself as a promoter of an end activity. That approach is not in line with the literature that supports tourism as a source of income for resident families and the destination companies (Incera & Fernández, 2015).

The relationship between pilgrimages and globalisation grows as more international pilgrims come to Fatima. They are suggesting the

substantial importance of the recent growth of the processes and of all possibilities in the exchange of information, which allows better dissemination of the Shrine as a place of pilgrimage and meeting with the Sacred. Moreover, in the context of pilgrimages, there are analytical dimensions that may be more decisive than informational globalisation, such as the evolution of customs, social and political events. Therefore, we also tested other globalisation measures to try to close this gap, but the results were not robust to our set of variables. In the appendix there are more details about social globalisation (Table A1), political globalisation (Table A2), economic globalisation (Table A3), and cultural globalisation (Table A4).

Christians must know the "altar of the world" if they want to welcome millions of people every year. Plus, four popes in a little over 50 years may seem like an easy task, but it does require some attention and much thought. Events that explore religious tourism such as World Youth Days Lisbon 2022 and spiritual retreats would attract people and would not jeopardise the nature and culture of the place.

The empirical basis established here, allow the development of measures to be implemented by regulators. Tourism in central Portugal can benefit from regulations that promote Fatima as an international destination. Besides the possibility of measures in partnership with the Sanctuary to promote events that aim to attract more pilgrims and national and international visitors.

An interesting issue for the debate on Catholic religious tourism is the development of other ways of defending and interpreting pilgrimage. Fedele (2014) addresses aspects of a new denomination of pilgrims “the energy ones”. For the local economy in the short-run, it is essential to receive pilgrims, but for Shrine, the loss of identity may not be beneficial in the long-run.

The study of the economic determinants of pilgrimages allowed us to empirically verify the relationship between the economy and the phenomenon of religious tourism. It is well known that the individual decision of to travel to the Shrine of Fatima or another sanctuary goes through the process of analysis of different factors, and our results only indicate another area that can motivate the pilgrim's decision. The results are in line with the literature suggesting that travellers have diverse motivations (Liutikas, 2017). In the next section, we present the main conclusions regarding this study.

5. CONCLUSION

From the economic perspective, we analysed the interaction of the number of pilgrims to the Fatima Shrine and its relationship with the economic reality. To achieve the objectives of the study, a Vector Autoregressive econometric model was estimated with annual data from 1994 to 2018, for the longest time span available (the informational globalisation variable being a limitation since its ends in 2016). Besides, empirical findings will provide a theoretical basis to support further studies.

The econometric model is statistically significant and revealed the presence of endogenous relationships. So, the primary short-term Granger causalities are that Gross Domestic Product and the unemployment rate has a strong (unidirectional) relationship with pilgrimages. Pilgrimages and globalisation have a bidirectional relationship. The pilgrimage still has a (unidirectional) relationship with the population, suggesting the existence of common factors that drive both variables.

Based on empirical results, it is proposed that those responsible for establishing public tourism (and religious tourism) policies in Portugal must consider the economic determinants of the pilgrimage phenomenon. Indeed, they ought to establish policies that consider the economic factors as the family income that may exert a significant impact on the decision to the pilgrimage. Another important measure for the promotion of religious tourism in the Marian context is the integration of public, private and religious agents to set projects and establish objectives together. The dialogue between agents can favour different sectors of the economy (hotels, restaurants, transport), especially in the city where shrines are located and in the neighbouring cities. Another issue addressed was the relationship of pilgrimages with informational globalisation. Perhaps this is the best time for the Church to promote the Sanctuary as a place of pilgrimage in a joint public-private initiative.

Researchers have a fundamental role in exploring and developing new studies linking religious pilgrimages/tourism to economic science. In addition, considering that the *homo religiosus* is present all the world, in various creeds and more and more they take into account their faith for economics actions. Which also means considering their economic life in their actions of faith (e.g. pilgrimages, tithe, charity, among others).

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APPENDIX

Table A1 - Model with social globalisation, 2 lags, and trend

Equation	Excluded	chi2	df	Prob > chi2
dlpil	dlgdp	16.195	1	0.000
dlpil	dlpop	0.077	1	0.781
dlpil	dkofs	2.1368	1	0.144
dlpil	ddese	17.314	1	0.000
dlpil	ALL	19.651	4	0.001
dlgdp	dlpil	0.00139	1	0.970
dlgdp	dlpop	32.295	1	0.000
dlgdp	dkofs	0.46708	1	0.494
dlgdp	ddese	18.472	1	0.000
dlgdp	ALL	66.075	4	0.000
dlpop	dlpil	2.644	1	0.104
dlpop	dlgdp	0.39144	1	0.532
dlpop	dkofs	0.03883	1	0.844
dlpop	ddese	12.172	1	0.000
dlpop	ALL	27.436	4	0.000
dkofs	dlpil	0.23792	1	0.626
dkofs	dlgdp	2.563	1	0.109
dkofs	dlpop	0.06257	1	0.802
dkofs	ddese	2.8883	1	0.089
dkofs	ALL	3.764	4	0.439
ddese	dlpil	1.3118	1	0.252
ddese	dlgdp	3.9965	1	0.046
ddese	dlpop	37.733	1	0.000
ddese	dkofs	0.90786	1	0.341
ddese	ALL	52.544	4	0.000

Table A2 - Model with political globalisation, 2 lags, and trend

Equation	Excluded	chi2	df	Prob > chi2
dlpil	dlgdp	14.783	1	0.000
dlpil	dlpop	0.11775	1	0.731
dlpil	dkofp	1.6018	1	0.206
dlpil	ddese	14.216	1	0.000
dlpil	ALL	18.692	4	0.001
dlgdp	dlpil	0.00085	1	0.977
dlgdp	dlpop	31.483	1	0.000
dlgdp	dkofp	7.3638	1	0.007
dlgdp	ddese	29.288	1	0.000
dlgdp	ALL	95.079	4	0.000
dlpop	dlpil	2.8588	1	0.091
dlpop	dlgdp	0.35401	1	0.552
dlpop	dkofp	1.7479	1	0.186
dlpop	ddese	14.653	1	0.000
dlpop	ALL	31.481	4	0.000
dkofp	dlpil	2.1424	1	0.143
dkofp	dlgdp	0.13738	1	0.711
dkofp	dlpop	0.01074	1	0.917
dkofp	ddese	0.94892	1	0.330
dkofp	ALL	6.486	4	0.166
ddese	dlpil	1.4833	1	0.223
ddese	dlgdp	4.8416	1	0.028
ddese	dlpop	36.166	1	0.000
ddese	dkofp	0.02468	1	0.875
ddese	ALL	49.48	4	0.000

Table A3 - Model with economic globalisation, 2 lags, and trend

Equation	Excluded	chi2	df	Prob > chi2
dlpil	dlgdp	13.176	1	0.000
dlpil	dlpop	0.07386	1	0.786
dlpil	dkofe	0.15865	1	0.690
dlpil	ddese	13.508	1	0.000
dlpil	ALL	16.107	4	0.003
dlgdp	dlpil	0.03624	1	0.849
dlgdp	dlpop	39.768	1	0.000
dlgdp	dkofe	2.0279	1	0.154
dlgdp	ddese	22.849	1	0.000
dlgdp	ALL	72.639	4	0.000
dlpop	dlpil	2.7793	1	0.095
dlpop	dlgdp	0.51072	1	0.475
dlpop	dkofe	0.0436	1	0.835
dlpop	ddese	11.859	1	0.001
dlpop	ALL	27.447	4	0.000
dkofe	dlpil	0.506	1	0.477
dkofe	dlgdp	2.5249	1	0.112
dkofe	dlpop	11.845	1	0.001
dkofe	ddese	0.26003	1	0.610
dkofe	ALL	17.552	4	0.002
ddese	dlpil	1.3373	1	0.248
ddese	dlgdp	4.5188	1	0.034
ddese	dlpop	36.167	1	0.000
ddese	dkofe	0.11516	1	0.734
ddese	ALL	49.794	4	0.000

Table A4 - Model with cultural globalisation, 1 lag, and trend

Equation	Excluded	chi2	df	Prob > chi2
dlpil	dlgdp	0.73665	1	0.391
dlpil	dlpop	0.45828	1	0.498
dlpil	dkofc	0.85728	1	0.354
dlpil	ddese	0.22954	1	0.632
dlpil	ALL	2.2778	4	0.685
dlgdp	dlpil	0.23832	1	0.625
dlgdp	dlpop	5.5154	1	0.019
dlgdp	dkofc	0.00379	1	0.951
dlgdp	ddese	2.0448	1	0.153
dlgdp	ALL	8.5164	4	0.074
dlpop	dlpil	0.09995	1	0.752
dlpop	dlgdp	0.04819	1	0.826
dlpop	dkofc	0.01698	1	0.896
dlpop	ddese	7.573	1	0.006
dlpop	ALL	24.388	4	0.000
dkofc	dlpil	0.3523	1	0.553
dkofc	dlgdp	0.18393	1	0.668
dkofc	dlpop	0.29122	1	0.589
dkofc	ddese	0.01553	1	0.901
dkofc	ALL	1.3297	4	0.856
ddese	dlpil	2.2764	1	0.131
ddese	dlgdp	0.48608	1	0.486
ddese	dlpop	11.422	1	0.001
ddese	dkofc	0.80591	1	0.369
ddese	ALL	13.576	4	0.009