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HOW IMPORTANT IS TOURISM FOR THE INTERNATIONAL TRANSMISSION OF CYCLICAL FLUCTUATIONS?

EVIDENCE FROM THE MEDITERRANEAN

Fabio Canova and Pietro Dallari

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Fabio Canova
European University Institute; e-mail: fabio.canova@eui.eu

Pietro Dallari
European Central Bank; e-mail: pietro.dallari@ecb.europa.eu

Address	Kaiserstrasse 29, 60311 Frankfurt am Main, Germany
Postal address	Postfach 16 03 19, 60066 Frankfurt am Main, Germany
Telephone	+49 69 1344 0
Internet	http://www.ecb.europa.eu
Fax	+49 69 1344 6000

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Abstract

We quantify the importance of the tourism channel for the international transmission of cyclical fluctuations to the Mediterranean basin. We use five destination countries and a number of source countries to provide broad evidence on the link. Source country output shocks produce important fluctuations in international tourism flows. Absent the tourism channel, the output effects in a typical destination country would be reduced by about one-fourth. Imported shocks account for an important portion of the fluctuations in destination countries variables. Policy prescriptions are discussed.

JEL Classification Numbers: E32; C32.

Keywords: International business cycles, Tourism flows, Mediterranean basin; Bayesian random coefficient VARs.

Non-technical summary

This paper looks at the international propagation of cyclical fluctuations in the Mediterranean region through the lenses of tourism flows. The economic literature has been concerned for a while with the international transmission of shocks and with the channels through which spillovers occur. The few studies that have looked at cyclical fluctuations in the Mediterranean have found that trade and financial channels are not important and that similarities and differences in the cyclical fluctuations in the region are mostly related to institutional and cultural factors. At present, little is known about the imported component of fluctuations in many Mediterranean countries and, in general, about the share of these imported fluctuations due to tourism related activities. The Mediterranean, however, is a cradle of tourism: in many countries tourism revenues are a large portion of the service account balance; tourism related activities account for a significant fraction of total employment; and, as the Arab spring demonstrates, reductions of tourism flows can cause important welfare losses in the destination countries. Therefore, looking at tourism becomes potentially important.

Two aspects are of particular relevance for policymakers and theorists of open economy models. First, to measure how important shocks originating outside of the region are for the Mediterranean economies and, in particular, how relevant shocks to tourism flows are. Second, to assess whether output fluctuations originating abroad propagate to the Mediterranean basin via the tourism channel. To answer these questions, our analysis uses both reduced form and structural techniques. The reduced form methods we employ are bilateral static and dynamic correlations of output growth in the source and destination countries and tourism flows growth. In turn, we use structural Bayesian panel vector autoregressive models to estimate the average and the individual destination country effects of source country shocks and to assess the relevance of the tourism channel in propagating fluctuations in the region. Average effects are useful as they give an idea of the results that would be observed in a hypothetical representative country belonging to the Mediterranean region. In our baseline exercises, the Euro area is used as the source country for a number of Mediterranean destinations that include Cyprus, Morocco, Syria, Tunisia and Turkey. Given that some of these countries receive a large portion of tourists from the United Kingdom, Russia and France, we also consider the latter together with selected destination countries.

We reach four main conclusions. First, output shocks in the Euro area generate important fluctuations in international tourism flows. Thus, the luxury good characteristics of international tourist flows is confirmed. Our analysis shows that the link is obscured if unconditional correlations are considered and the predictable part of the fluctuations is not filtered out of the data. In addition, we show that the reaction of tourism flows to income shocks is much stronger in recessions than in expansions. Second, tourism is an important channel of international transmission of output shocks. For example, if the tourist channel were wiped out, the output effects in a typical destination country would be reduced by one-fourth. Third, shocks to tourist arrivals unrelated to income fluctuations in the source country are also important for destination countries output. While disturbances of this type may have to do with preferences for certain location, aggressive marketing strategies, and political instabilities, it is clear that making tourism flows more predictable will improve

the ability of destination countries to effectively deal with tourists flows and reduce the downside risks for the local communities. Fourth, in the five destination countries we consider, imported shocks explain a considerable fraction of the variability of domestic variables. Taken together, our findings represent a strong case in favor of European policies trying to improve the integration of the Mediterranean into the EU that are not only devoted to establishing stronger trade links. We argue that fostering the tourist relationships may help to integrate faster Mediterranean economies with the EU and may have long lasting beneficial output effects because of the virtuous investment cycle they ignite.

1 Introduction

A number of studies have recently looked at the characteristics of cyclical fluctuations in the Mediterranean basin (see Canova and Ciccarelli (2012), Canova and Schlaepfer (2012),
Canova and Altug (2012)). While the focus of these studies is different, the evidence they provide consistently suggests that business cycles in the region are peculiar. For example, if one only considers canonical economic indicators representative of production and trade, cycles in the Mediterranean region are quite heterogeneous, the idiosyncratic component is non-negligible, and international comovements occur primarily with the Euro area and not with the neighbors. In addition, these tendencies are persistent and there is no trend toward greater global or regional integration. Moreover, factors related to the institutional and cultural background seem to be important to explain the similarities and differences in business cycles features of the region. Finally, time variations in the characteristics of domestic business cycles are unrelated to preferential trade and financial agreements signed with the European Union (EU). Thus, Mediterranean business cycles differ from those of, say, South Asia or Latina America, where idiosyncrasies have been progressively eliminated and countries have become effectively more integrated into the world economy over the last 20 years. Furthermore, the special pattern of cyclical correlations the region displays indicates that alternative channels of international transmission, different from traditional trade and financial linkages, could be relevant to understand the nature of the fluctuations.

This paper looks at the international propagation of cyclical fluctuations to the region through the lenses of tourism flows. We are interested in two questions. First, we want to measure how important shocks originating outside of the region are for the Mediterranean economies and, in particular, how relevant shocks to tourism flows are. Second, we want to assess whether output fluctuations originating abroad propagate to the Mediterranean basin via the tourism channel. While production and trade indicators alone are too fragmented to provide a cohesive picture, there may be room for certain economic activities to play a role in shaping business fluctuations in the Mediterranean. Tourism is a good candidate and a few numbers may indicate why.

The eleven non-EU countries belonging to the southern Mediterranean rim - i.e. Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia and Turkey, aka MED 11, Lanquart (2011) - received 82.3 million of foreign tourists in 2010. In absolute terms the number is modest, just around 10% of global international tourist arrivals; in comparison, France alone in 2010 received 77 million tourists. However, the compounded growth rate since 1990 has been 325%, well above the 214% registered globally over the same period. Turkey, Egypt, Morocco and Tunisia are the preferred destinations and Europe is the main generating market, representing 58% of foreign tourists arrivals in 2007. Russia sends a large fraction of tourist to Turkey and Syria and has a fast growing share of the tourist market in the Mediterranean.

All countries in the region are, for the most part, poor. According to the 2012 World Economic Outlook Database prepared by the International Monetary Fund, and with the exception of Turkey, they rank between the 43rd and the 89th position in a list of 184. Tourism related activities are important for the local economies. For example, the GDP share of tourism-related activities in the MED 11 was 9.1% in 2010.

Tourism receipts as a share of total service receipts are estimated to be 71.6% in Turkey, 67.9% in Syria, 67.5% in Morocco, 63.3% in Tunisia and 50.1% in Egypt in 2010. Employment in the tourism sector grew 152% from 1990 to 2000 and a further 144% in the following decade, and now represents on average 13.6% of total employment, according to Lanquart (2011). In some countries, such as Tunisia or Egypt, the share of the population employed in tourist related activities is larger and exceeds 25%. Thus, the fair performance in the global tourism market in recent years, the large share of tourism related activities, and a relatively small dimension of the economies, give tourism a chance to play a role in the international transmission of shocks to the region.

The question of whether fluctuations in small open economies are mainly driven by domestic or imported factors has long being discussed in the international business cycle literature (see Canova (2005), Kose and Prasad (2010)) but the conclusions are still controversial. However, very little is known about the imported component of fluctuations in many Mediterranean countries and, in general, about the share of these imported fluctuations due to tourism related activities. Our investigation sheds light on both issues and quantifies the importance of the tourism channel for the international propagation of output shocks.

The analysis employs reduced form tools, documenting unconditional static and dynamic correlations between outputs and tourism flows, and more structural methods, measuring the effect of output and tourism shocks in the source country on the destination country variables[1]. In the baseline exercises, the Euro area is used as the source country for a number of Mediterranean destinations because of the importance of European tourists in the region and the data availability. Given that certain countries receive a large portion of tourists from the United Kingdom, Russia, France, we will also measure the impact of income shocks originating in these countries on the domestic variables of selected destination countries. Given that international output comovements in response to source country output shocks are the sum of a direct effect and an indirect effect via the tourist channel, we conduct a counterfactual eliminating this latter effect, so as to quantify the importance of the tourism channel for the international transmission of cyclical fluctuations.

The reduced form connection between output cycles in the source country and tourism flows directed to the Mediterranean is modest. A stronger connection emerges if one instead focuses on periods when economic activity contracts. The reduced form relationship between tourism flows and cyclical activity in the destination countries is instead significant and tourism flows have predictive power for future developments in the destination country output cycles. Furthermore, the correlation between tourism flows and output in the destination countries is higher than the correlation between output cycles in the source and in the destination countries, and stronger in the long run than at business cycle frequencies.

On average, unexpected output disturbances in the source country produce considerable movements in tourist flows and important output effects in the destination country. The latter then induce important second round consequences on local investment and net exports. The behavior of the individual economies is somewhat idiosyncratic. For example, the contemporaneous reaction of tourist flows in Cyprus, Tunisia, Syria and Morocco to source country output shocks is positive and significant but the initial effect on tourist

[1]We use the term "source" country to refer to the country or the region where tourists come from and "destination" country to indicate the countries where tourists go.

flows in Turkey is small and significant movements appear only with one year delay. In addition, while output, consumption, investment and net export generally increase in response to source country output shocks, countercyclical movements are observed in Morocco. Interestingly, the shape and the magnitude of the responses induced by source country output shocks are roughly similar if different source countries and different measures of tourism flows are employed.

Imported shocks account for a large portion of the fluctuations in the destination economies: in fact, between 30 to 70% of the fluctuations in domestic output, consumption and investment are due to foreign disturbances and tourism shocks account for about half of this percentage. In addition, tourist flows are an important channel of transmission of cyclical fluctuations: on average, the impact effect on domestic output would be one-fourth smaller without this channel. For the individual countries the magnitude of the effect is less precisely estimated but the same outcome ensues for Cyprus, Morocco, Syria and Turkey.

It is difficult to relate our results to the existing literature because, apart from Sturm and Sauter (2010), who examine the performance of the tourism sector during the 2007-2009 recession, the relationship between business and tourism cycles in the region has not been studied. There are a number of case studies examining the relationship between tourism flows and economic conditions in certain countries, see e.g. Guizzardi and Mazzocchi (2010) (Italy), Costas and Bruno (2009) (Switzerland), Eeckels et al (2006) (Greece), Mayers and Jackman (2011) (Barbados), Sergo and Poropat (2010) (Croatia), Latzko (2004) (Hawaii), to mention but a few, but the methodology, the samples and the data considered in these studies are different. Furthermore, because they consider only one country and an aggregate flow of tourists, these studies lack a multilateral international perspective and are unable to provide robust evidence on the relative importance of the tourism channel for the international transmission of cyclical fluctuations or the role of tourism disturbances for domestic activity. By systematically investigating a variety of countries that share geographical proximity and compete for tourists, and disaggregating tourism flows by source country, we hope to provide a more accurate and reliable picture.

The rest of the paper is organized as follows. Section 2 describes the data used. Section 3 presents the methods. Section 4 summarizes the evidence obtained using the number of tourist arrivals. Section 5 considers alternative measures of tourist flows. Section 6 concludes.

2 Data

Systematic and comparable tourism data for the Mediterranean is difficult to obtain. Many countries do not report separate tourism statistics - these are typically conglomerated in the service account balance - and expenditure data rarely reflect actual expenditures incurred by tourists (typically, number of nights times a notional measure of average daily expenditure is used). Moreover, when the data is available, the sample is often too short or does not cover one complete cycle, making it unsuited for the purpose of studying the international transmission of cyclical fluctuations. Finally, it is important to have tourism flows disaggregated by country of origin.

The World Bank publishes tourism data in a large number of countries, but the sample is very short and only aggregate figures are reported. Using aggregated tourism data is problematic since it is only recently that cyclical fluctuations have become more synchronized around the globe. Thus, cyclical changes in an hypothetical aggregated source country need not to have any relationship with cyclical tourism changes. The World Tourism Organization (UNWTO) is now trying to consistently measure and record the state of the tourism sector worldwide. However, the project is still in its infant stage and the information available for the Mediterranean region covers only the 2006-2010 period, which is of limited use for studies like ours[2]. Hence, the only viable sources of information about tourism flows are those reported by central banks, the statistical offices or the tourism ministry of the destination countries. Heterogeneities in the availability, the quality and the length of the data sets should not be overlooked when comparing the results across countries.

Tourism data usually comes into three categories: number of tourist arrivals registered at the border, number of nights spent in hotels, and total per-capita expenditures. Arrivals can be retrieved quickly from police checks at airports, harbors and borders; the other two categories require a lot more statistical effort. Given the costs involved, Mediterranean countries typically report the number of arrivals, and in a few isolated cases, one of the other two quantities. If tourism demand is influenced by households' disposable income, which seems reasonable since international tourism is a luxury good, then only total per-capita expenditures can be confidently related to changes in the propensity to consume induced by evolving economic conditions. The number of nights spent in hotels may indirectly capture such changes, as households may decide to shorten their vacations if income falls. The number of arrivals registered at the border, on the other hand, captures well the binary decision of going versus not going, but it may be insensitive to mild income fluctuations in the source country.

Table 1 summarizes the available data. We have tourist arrivals data by source country for Cyprus, Turkey, Tunisia, Morocco and Syria. Thus, out of the four major non-European tourist destinations in the Mediterranean, only Egypt is missing. In Algeria, Libya and Lebanon, the tourism sector is relatively small, so omission of these countries is unlikely to cause important biases. For Israel, tourism flows are important but primarily driven by non-economic considerations. We include Cyprus in our sample, even though it is part of the EU, because it has good data; it is geographically close to several countries we analyze; and it effectively competes for tourists with the other destinations on the eastern and southern coast of the Mediterranean sea. Data on the number of nights spent in hotels is available only for Tunisia, while per-capita expenditures data is available just for Cyprus. Due to the limited coverage, these measures are employed only for sensitivity analysis. The frequency of the data is annual. Quarterly data are available for Cyprus and Turkey but the sample covers less than 10 years, making them unusable for our purposes.

Tourism data is used in conjunction with macroeconomic variables monitoring sectors of the local economy. We have data on gross domestic product, household final consumption expenditures, gross fixed capital formation, exports and imports of goods. We were unable to find good measures of labor market conditions that are sufficiently long and complete to match the length of tourism data. Lack of labor market data is

[2]We thank Laura Munoz (UNWTO) for making available to us all the data in the "Compendium of Tourism Statistics" and the "Yearbook of Tourism Statistics".

not fatal, but given the relevance of the tourism sector for employment in these countries, it may render the interpretation problematic when some unexpected patterns are present.

To insulate our analysis from idiosyncratic noise, we focus attention on tourist arrivals from four major regions: the Euro area, the United Kingdom, Russia and France. We separate the United Kingdom from other countries in Europe because the cyclical fluctuations are not perfectly aligned and because British tourism flows to Cyprus are large. We also focus on Russia because it is a major economic partner and a major source country for tourism flows for Turkey, Syria and Cyprus. We supplement the analysis conducted with Euro area data with France data since aggregation may wash out important links. Euro area output is constructed in two ways: using the synthetic aggregate Euro area 15 output data provided by Eurostat; using a population based weighted average of individual output data for those countries for which tourism flows are available. By and large, it does not matter which of the two series is used: they are highly correlated (above 0.9) and have peaks and troughs which are perfectly aligned. We thus report results with the latter measure.

All macroeconomic data, except trade in goods, comes from the World Bank World dataBank and it is expressed in constant 2000 US dollars. Nominal exports and imports of goods come from the International Monetary Fund International Financial Statistics data set. These series are deflated using the domestic GDP deflator for 2000.

In measuring the cyclical role of tourism, one should be aware that the link between economic conditions in the source country and tourism flows is complex and their comovements are influenced by a number of factors peculiar to the tourism sector. For example, there are lags between the time when the decision to go on holiday is taken and the time when the holiday actually takes place. Although tourism in the region is not necessarily concentrated in one season, a large portion of it is represented by families and elderly people who usually plan their holidays well in advance. Consequently, it is unclear how shocks impacting on households' disposable income affect tourism flows. If negative shocks to tourist arrivals from a source country are resilient despite the improving economic outlook, for instance because holidays were booked several months in advance, the adverse consequences of these shocks would be magnified when observed with the lenses of tourism flows. Alternatively, if shocks that were not foreseen in advance materialize at a later time, they may end up having a minor impact on tourism demand because the costs of disrupting the booking process make it more convenient to keep a finalized reservation, despite the deteriorating economic condition, softening the consequences of negative income shocks. Our use of annual data may make these lags less important, but still they should be kept in mind when interpreting the results. Another factor to take into account is that tourist agencies tend to specialize in particular destinations, making the connection between business cycle fluctuations in the source country and tourist flows less dependent on income and prices of the services offered and more a function of cohort effects, advertisement strategies and other non-market features. Finally, destinations in the region are close substitutes and tourist flows may be easily diverted from one country to another because of political uncertainty, medical scares, or rumors about threats that tourists may face.

3 Methodology

The analysis will be conducted using both reduced form and structural techniques. The reduced form methods we employ are bilateral static and dynamic correlations of outputs growth in the source and destination countries and tourism flows growth. To compute dynamic correlations we turn the data in frequency domain and compute bilateral correlations between any two of the three variables at certain frequencies.

We will also relate bilateral output growth correlations in source and destination countries with the average level of tourist flows, once we control for a number of country specific and macroeconomic characteristics. In particular, letting $m_{ij} = corr(y_{it}, y_{jt})$ and letting $\bar{T}_{ij}$, be the average tourist flows between country i and j, we compute conditional rank correlation between m_{ij} and $\bar{T}_{ij}$, given a set of controls X_j. In our case X_j includes a measure of openness, to account for potential comovements due to trade; the industry share of value added, to control for the composition effects described by Imbs (2004); the log-level of GDP per capita, to account for the possibility that development affects the synchronicity of output cycles; and the share of credit to GDP to proxy for the financial development of the country. Rank rather than Pearson correlations are reported to allow the relationship to take a non-linear form.

We use structural Bayesian panel VARs to estimate the average and the individual destination country effects of source country shocks and to assess the relevance of the tourism channel in propagating fluctuations in the region. The VAR model for each country includes source country real gross domestic product, the number of tourist arrivals from the source country and four destination country variables: real gross domestic product, real household final consumption expenditures, real gross fixed capital formation and real net exports of goods. All series enter in logs. We use one lag of the dependent variables, as this is sufficient to whiten the residuals, a constant and a linear trend.

Given that each destination country is small relative to the source countries, the structural model assumes that source country variables are weakly exogenous with respect to destination country variables. Thus, source country output and tourism shocks may generate contemporaneous fluctuations in the destination country, but not vice-versa. The weak exogeneity assumption of source country output is strongly supported by the forecast error variance decomposition: the combined effect of shocks in the destination country is a negligible source of fluctuations for source country output at all horizons. The restriction that tourism flows feed into destination country output but not vice-versa within a year is more controversial as political turmoil may affect domestic output and scare tourists away. Since the available sample excludes the recent Arab spring, we believe our identification assumption is reasonable. Finally, we impose the restriction that tourism shocks do not feed contemporaneously into source country output.

Because the time dimension of our data set is not large, estimates of the VAR coefficients are likely to be imprecise. The presence of considerable cyclical heterogeneities indicates that it is not a good idea to run a pooled VAR for the five countries. To reduce the small sample problem, we use a multi-country random coefficient Bayesian model. The distinctive feature of such model is that it allows us to efficiently combine unit-specific and cross sectional information, thus mitigating small sample biases, without imposing homogeneous dynamics. To achieve this, we assume that country-specific dynamic coefficients are realizations

from the same underlying data generating process. This means that the dynamics of transmission of source country shocks are potentially different across countries, but the distribution from which they come from has a common mean.

Multi-country random coefficient Bayesian VAR models have been used in Canova (2005), Ciccarelli and Rebucci (2006), Canova and Pappa (2007), Jarocinski (2010). The specification we adopt is similar to Jarocinski (2010). For each country, the VAR model is:

$$y_{n,t} = B_n' y_{n,t-1} + \Gamma_n' z_{n,t} + u_{n,t} \tag{1}$$

where $n = 1, 2, \ldots, N$ denotes countries; $t = 1, 2, \ldots, T_n$ time and T_n varies with the country; $y_{n,t}$ is an $M \times 1$ vector of endogenous variables; $z_{n,t}$ collects deterministic components; $u_{n,t}$ are VAR innovations; B_n and Γ_n are matrices containing the slopes and the intercept coefficients. Rewrite (1) as:

$$Y_n = X_n B_n + Z_n \Gamma_n + U_n \tag{2}$$

where X_n is the matrix obtained by stacking vertically the T_n observations in $y_{n,t-1}'$. Thus Y_n and U_n are $T_n \times M$; X_n is $T_n \times M$; Z_n is $T_n \times Q$; B_n is $K \times M$; Γ_n is $Q \times M$. Let $y_n \equiv vec(Y_n)$, $\beta_n \equiv vec(B_n)$ and $\gamma_n \equiv vec(\Gamma_n)$. We assume that the slope coefficients satisfy:

$$p(\beta_n | \bar{\beta}, \tau, O_n) = N(\bar{\beta}, \tau \times O_n) \tag{3}$$

where $\bar{\beta}$ is the common mean and $\tau \times O_n$ is the dispersion. We restrict $\tau \times O_n$ to be diagonal, where τ is a parameter that controls the general tightness of the restriction and O_n is a scale factor. Letting σ^2 be the variance of the error in the univariate autoregression of each VAR series, the i-th element of O_n is:

$$O_{n,i} = diag\left(\sigma_{n,i}^2 \otimes \frac{1}{\sigma_{n,n}^2}\right), \quad i = 1, ...m. \tag{4}$$

We employ this scaling factor since, with a single variance parameter τ, it may be difficult to capture the cross variable variations in the β_n. Adding O_n makes the variance of $\beta_{n,i}$ specific to the variable i. One may have some subjective idea about how much the country-specific coefficients differ from the common mean and thus pin down the magnitude of τ. Here we prefer to be agnostic and use a diffuse prior:

$$p(\tau) \propto 1 \tag{5}$$

The VAR innovations are i.i.d. $N(0, \Sigma_n)$ and the prior on their covariance matrix is also diffuse, i.e.:

$$p(\Sigma_n) \propto |\Sigma_n|^{-\frac{1}{2}(N+1)} \tag{6}$$

The priors for the coefficients on the deterministic variables and for the common mean are also diffuse:

$$p(\gamma_n) \propto 1 \tag{7}$$

$$p(\bar{\beta}) \propto 1 \tag{8}$$

The posterior densities for the coefficient of interest are computed by combining prior information with the likelihood which, for the stacked vector of countries, is:

$$p(Y|\beta_n, \gamma_n, \Sigma_n) \propto \Pi_n |\Sigma_n|^{-\frac{T_n}{2}} exp\left[-\frac{1}{2}\sum_n (y_n - X_n\beta_n - Z_n\gamma_n)'(\Sigma_n^{-1} \otimes I_{T_n})(y_n - X_n\beta_n - Z_n\gamma_n)\right] \tag{9}$$

Since the priors are conjugate, the conditional posterior densities are analytically available and this enables us to numerically compute the joint posterior distributions with the Gibbs sampler.

The joint posterior for the unknowns is:

$$\begin{aligned} p(\beta_n, \gamma_n, \Sigma_n, \bar{\beta}, \tau|Y) &\propto p(\beta_n, \gamma_n, \Sigma_n, \bar{\beta}, \tau)\, p(Y|\beta_n, \gamma_n, \Sigma_n, \bar{\beta}, \tau) \\ &\propto \Pi_n |\Sigma_n|^{-\frac{T_n}{2}} exp\left[-\frac{1}{2}\sum_n (y_n - X_n\beta_n - Z_n\gamma_n)'(\Sigma_n^{-1} \otimes I_{T_n})(y_n - X_n\beta_n - Z_n\gamma_n)\right] \\ &\quad \times |\tau|^{-\frac{NMK}{2}} exp\left[-\frac{1}{2}\sum_n (\beta_n - \bar{\beta})'(\tau \times O_n)^{-1}(\beta_n - \bar{\beta})\right] \\ &\quad \times \tau^{-\frac{\nu+2}{2}} exp\left[-\frac{1}{2}\frac{s}{\tau}\right] \\ &\quad \times \Pi_n |\Sigma_n|^{-\frac{M+1}{2}} \end{aligned} \tag{10}$$

Let $\Theta \equiv [\beta_n,\ \gamma_n,\ \Sigma_n,\ \bar{\beta},\ \tau]$ and denote by Θ/α the vector of Θ excluding the coefficient α. The conditional posterior of β_n is:

$$p(\beta_n|Y, \Theta/\beta_n) = N(\tilde{\beta}_n, \tilde{\Delta}_n) \tag{11}$$

where

$$\tilde{\Delta}_n = \left(\Sigma_n^{-1} \otimes X_n'X_n + \tau^{-1}O_n^{-1}\right)^{-1}$$

and

$$\tilde{\beta}_n = \tilde{\Delta}_n \times \left((\Sigma_n^{-1} \otimes X_n')(y_n - Z_n\gamma_n) + \tau^{-1}O_n^{-1}\bar{\beta}\right)$$

The conditional posterior of γ_n is:

$$p(\gamma_n|Y, \Theta/\gamma_n) = N(\tilde{\gamma}_n, \tilde{\Gamma}_n) \tag{12}$$

where

$$\tilde{\Gamma}_n = \left(\Sigma_n^{-1} \otimes Z_n'Z_n\right)^{-1}$$

and

$$\tilde{\gamma}_n = \tilde{\Gamma}_n \times \left(\Sigma_n^{-1} \otimes Z_n'\right)(y_n - X_n\beta_n)$$

The conditional posterior of Σ_n is:

$$p(\Sigma_n|Y, \Theta/\Sigma_n) = iW\left((Y_n - X_nB_n - Z_nC_n)'(Y_n - X_nB_n - Z_nC_n), T_n\right) \tag{13}$$

The conditional posterior of $\bar{\beta}$ is:

$$p(\bar{\beta}|Y, \Theta) = N(\bar{\bar{\beta}}, \bar{\Delta}) \tag{14}$$

where

$$\bar{\Delta} = \left(\sum_n \tau^{-1} O_n^{-1}\right)^{-1}$$

and

$$\bar{\bar{\beta}} = \bar{\Delta} \times \sum_n \tau^{-1} O_n^{-1} \beta_n$$

The conditional posterior of τ is:

$$p(\tau|Y, \Theta/\tau) = IG\left(\frac{(N \times M \times P \times M) + \nu}{2}, \frac{\sum_n \left(\beta_n - \bar{\beta}\right)'^{-1}\left(\beta_n - \bar{\beta}\right) + s}{2}\right) \tag{15}$$

By iteratively sampling from (11)-(15), one obtains a sequence for Θ that can be used for inference. We make 1300000 draws, use 300000 for burn-in and keep one every 1000 draws of the remaining for inference. Convergence and autocorrelation diagnostics are satisfied with our selected sample.

A few words of explanations about our choices are needed. The multi-country VAR model is put into action by adopting a hierarchical structure in which the country-specific coefficients are randomly drawn from a Normal distribution with a common mean. This is typically referred as the first stage of the hierarchy. The second stage consists of prior assumptions about the distributions of the common mean and of the country-specific variances. For the former we employ noninformative priors; the latter are estimated in an Empirical Bayes fashion.

The conditional posterior for β_n has a natural weighted average format where sample and prior information receive weights proportional to their relative precision. Thus, the country model whose coefficients are more tightly estimated receives more weight relative to the prior as compared to the model where the coefficients are imprecisely estimated. The variance of country-specific coefficients depends on how different the estimated country-specific coefficients are and their precision. If they are different and the uncertainty around the estimates is small, the variance in the second level of the hierarchy will be large indicating significant heterogeneity.

3.1 Counterfactual

The structural responses of the destination countries' variables to source country output shocks are the sum of two distinct effects: a pure output shock effect and an effect due to changes in tourism flows. The first measures spin-offs due to the fact that shocks in source and destination country output may be correlated; the second the indirect effect that source country output fluctuations may have via tourism flows. Thus, while the first is the "common shock" component, the second measures the "international transmission" due to tourism.

To isolate the contribution of the latter, we compute an hypothetical impulse response capturing only the common shock effect, and compare its shape and magnitude to the one originally estimated. Whenever differences in the responses are significant, the tourism channel plays a non-trivial role in the transmission of shocks from the source to the destination country.

We focus on the measurement of the "multiplier" effect that tourism may have for output in the destination economies. While it is possible to compute multipliers for the other three variables, one needs to add assumptions which may be difficult to rationalize in our context [3].

To see what the exercise involves, consider the matrix A_0 used to transform each country reduced form VAR into a structural model, i.e. $A_0 D A_0' = \Sigma^{-1}$, where D is a diagonal matrix. A_0 is a 6×6 matrix with a lower triangular structure in the first three equations - the rest is unrestricted. The instantaneous effect of a source country output shock on the destination country's output is given by the coefficient $a_{3,1}$. If tourism flows respond to source country output shocks - i.e. $a_{2,1} \neq 0$ - and if the destination country output responds to tourism flows on impact - i.e. $a_{3,2} \neq 0$ - the indirect effect of source country output shocks is $a_{2,1} \times a_{3,2}$. When transmission extends beyond the impact period, tourism flows respond to source output shocks at future horizon and lagged tourism coefficients enter significantly the equation for output in the destination country. To eliminate the indirect effect at all horizons, we generate an artificial tourism shock series that offsets the response of tourism flows to a source country output shock. Given our setup, we can construct the shock series using the country-specific residuals covariance matrix Σ_n or the average covariance $\bar{\Sigma} \equiv \frac{1}{N} \sum_{n=1}^{N} \Sigma_n$. Let the average and the country-specific impulse responses be:

$$\bar{\Phi}_{i,q,h} = e_i \bar{\Lambda}^{h-1} (A_0(\bar{\Sigma}))_q' \tag{16}$$

$$\Phi_{i,q,h,n} = e_i \Lambda_n^{h-1} (A_0(\Sigma_n))_q' \tag{17}$$

where $\bar{\Lambda}$ is the companion representation of the matrix of average slope coefficients $\bar{\beta}$ and Λ_n is the equivalent companion form for the country-specific slope coefficients β_n; e_i is a selection vector picking the response of a particular variable i, q indicates the shock of interest; $h = 1, \ldots, H$ defines the horizon; and the dependence of A_0 on Σ_n or $\bar{\Sigma}$ is made explicit.

To set to zero the response of tourist flows to an output shock in the source country, $\bar{\Phi}_{2,1,h} = \Phi_{2,1,h,n} =$

[3] For example, to control for the effect that tourism has on net exports, we need also to eliminate all intermediate channels that from source country output may spread to domestic consumption, investment and to net exports, and this requires a set of shocks which are correlated in a particular and improbable way.

0, for all h and for each n, we construct an artificial average shock $\bar{\epsilon}_{i,h}$ and an artificial country-specific shock$\epsilon_{i,h,n}$. For $h = 1$, the artificial shocks are defined as:

$$\bar{\epsilon}_{2,1} = -\frac{(A_0(\bar{\Sigma}))'_{2,1}}{(A_0(\bar{\Sigma}))'_{2,2}} \tag{18}$$

$$\epsilon_{2,1,n} = -\frac{(A_0(\Sigma_n))'_{2,1}}{(A_0(\Sigma_n))'_{2,2}} \tag{19}$$

For all $h > 1$, the artificial shocks are:

$$\bar{\epsilon}_{2,h} = \frac{\bar{\Phi}_{2,1,h} + \sum_{j=1}^{h-1} e_{i=2}\bar{\Lambda}^{h-j}A_0(\bar{\Sigma})'_{q=2}\bar{\epsilon}_{2,j}}{e_{i=2}A_0(\bar{\Sigma})'_{q=2}} \tag{20}$$

$$\epsilon_{2,h,n} = \frac{\Phi_{2,1,h,n} + \sum_{j=1}^{h-1} e_{i=2}\Lambda_n^{h-j}A_0(\Sigma_n)'_{q=2}\epsilon_{2,j,n}}{e_{i=2}A_0(\Sigma_n)'_{q=2}} \tag{21}$$

Thus, the hypothetical responses measuring only the direct effect of the output shock are:

$$\tilde{\bar{\Phi}}_{i,1,h} = \bar{\Phi}_{i,1,h} + \sum_{j=1}^{h} e_i\bar{\Lambda}^{h-j}A_0(\bar{\Sigma})'_{q=2}\bar{\epsilon}_{2,j} \tag{22}$$

$$\tilde{\Phi}_{i,1,h,n} = \Phi_{i,1,h,n} + \sum_{j=1}^{h} e_i\Lambda_n^{h-j}A_0(\Sigma_n)'_{q=2}\epsilon_{2,j,n} \tag{23}$$

4 The results

We organize the presentation of the results in several subsections. First, we look at the dynamics of tourist flows and present reduced form evidence. Then, we look at average and individual country responses estimated from a baseline BVAR and analyze the dynamics of tourism flows and domestic variables in few special cases of interest. Finally, we report the results of the counterfactual experiment.

4.1 The tourist data

To begin with, we briefly discuss tourism flows data we have available. The on-line appendix plots tourist arrival data for Cyprus, Morocco, Syria, Tunisia and Turkey by source country [4].

Tourism flows are heterogeneous at least in two dimensions: aggregate trends are different; the evolution by source country is different. For example, aggregate tourist arrivals to Cyprus and Tunisia fluctuate around a positive trend since the 1980s, while in Morocco and Syria total tourist arrivals stay flat until the late 1990s and pick up only afterwards. In Turkey total tourist arrivals grew for the entire sample, but at a stronger pace

[4]For Morocco we plot - and use in the analysis that follows - a simple moving average of two consecutive observations of the original data since the latter displays marked swings in the first six years of the sample.

since the year 2000. Differences in the evolution of tourist arrivals by source country can, at times, be explained by source country factors - for example, the number of Irish tourists visiting Cyprus fell back to mid '80s values, following the financial disruptions of 2008. In others cases, see e.g. the evolution of the number of Finnish tourists arriving in Cyprus, which steadily grew since mid '80s, peaked in 1990, and quickly fell afterwards and never recovered, they can be explained by evolving consumers' tastes, marketing strategies or the segmentation of tourism demand. Note that certain source countries dominate tourist arrivals in certain destinations: for example, British tourists to Cyprus represent around half of annual arrivals to the island, and French tourists to Tunisia account for more than 40% of the total annual inflow.

4.2 Reduced-form evidence

Figure 1 plots output growth and tourism growth in the source countries and output growth in the five destination countries: dashdotted lines represent annual changes of (log) tourist arrivals; continuous and dashed lines indicate annual changes of the source country and destination country (log) output respectively; shaded regions denote source country recessions. Recession dates for the Euro area are from the CEPR, for the UK from the Bank of England, for Russia and France from the Economic Cycle Research Institute.

Tourist arrivals growth data looks quite cyclical and downward movements correspond to recessionary episodes in the source countries. This is very clear for Cyprus were the sample is sufficiently long to cover three recessions in the UK and the Euro area. In Morocco and Tunisia, the sample is considerably shorter but also in this case the growth rate of tourist arrivals is negative around Euro area (France) recessions. Consistent with this pattern, the number of Russian tourist arrivals to Syria and Turkey displays two large and consecutive drops in 1998 and 1999, in coincidence with the Russian financial crisis, and in 2009 when Russia experienced the worst contraction since the Ruble crisis.

While tourism flows are negatively affected by recessionary episodes, it is of interest to know whether comovements between source country output and tourism cycles extend beyond contraction episodes. Table 2 reports bilateral unconditional static cross-correlations up to two leads and lags of the three variables. In general, comovements between source country output and tourism flows are low: the largest value is observed for Russian output and Russian arrivals to Syria.

Why are the correlations generally low? As we have already mentioned a number of elements specific to the tourism market may shift the relationship between output and arrivals forward or backward in time. To dig deeper into these numbers, we separate correlations at business cycle frequencies from those at long run frequencies. Intuitively, long term tourism flows should reflect the evolution of economic prosperity in the source countries while cyclical factors may be more important in describing the link between tourism flows and destination country output. In Table 3 frequencies centered around $\pi/2$ correspond to cycles of about four years; frequencies around zero capture long run comovements.

In many cases, the correlation between source country output and tourist arrivals is stronger in the long run than at business cycles frequencies. Consistent with the static correlations, the three largest dynamic correlations correspond to Russian arrivals to Syria, French arrivals to Morocco and Russian arrivals to

Turkey, all of which are close to or above 0.5.

While the first part of the relationship is somewhat weak, the connection between the flow of tourists and output in the destination country is stronger - see the middle panel of Table 2. The highest correlation 0.7 is between tourist arrivals from the United Kingdom and Cyprus' output; the correlations between Euro area tourist arrivals and Cyprus' output; Euro area and French arrivals and Tunisia's output, and Euro area and Russian arrivals and Turkey's output are also strong. Moreover, the maximum correlation is generally contemporaneous. The exceptions are Morocco and Syria where output cycles lag tourist arrivals from the Euro area. Note that the correlation between tourist arrivals and destination country's output is stronger in the long run, indicating that the beneficial effects of tourism flows are long lasting.

Interestingly, in eight out of ten total combinations, the contemporaneous correlation between tourist arrivals and output in the destination country is larger than the correlation between outputs in the source and destination country. The two exceptions are represented by the Euro area and Cyprus and by France and Morocco, probably because source country and destination country output cycles are well synchronized in these two pairs. In the long run, the comovements between tourism and output cycles are generally larger than those among outputs [5].

The statistics we report in Tables 2 and 3 give a glimpse of the unconditional role of tourist flows for each country pair. To sharpen the conclusions, we have also computed rank correlations between a measure of bilateral output synchronicity and bilateral tourist flows, netting out the effects due to trade links, the level of industrial and financial development and the industrial structure of the destination country. The results partially support the idea that tourism flows matter: rank correlations are modest (0.24) but they are significantly different from zero at the 10 % level.

4.3 Structural evidence: average responses

Average responses are useful as they give an idea of the dynamics of the variables of interest that would be observed in a hypothetical representative country belonging to the Mediterranean region. Since small open economy models often use such an assumption, the results we present are of direct interest to theorists modeling imported cyclical fluctuations. Figure 2 plots the responses to a Euro area output shock. The size of the shock is normalized to one; the continuous line represents the median posterior response, computed horizon by horizon, and the dotted lines denote 68% posteriors credible sets.

The tourism variable reacts positively and significantly on impact. The magnitude is large, as a 1% increase in Euro area output triggers an increase in tourism flows of approximately 2%. The response is maximal on impact and then it slowly returns to zero. Given that the reduced form evidence suggested that output in the source country and tourism flows are weakly correlated, an explanation for this stronger

[5] We have also computed Granger causality tests in order to check whether (i) output Granger causes tourist flows in the source country and (ii) tourist arrivals Granger cause destination country's output. The results are in the on-line appendix. In only one out of ten cases output Granger causes tourism in the source country - it is with Russian output and Russian tourist arrivals to Syria - confirming that tourism cycles in the source countries are not strongly related to local economic conditions in the source country. On the other hand, tourism flows Granger cause destination country's output in three cases: Euro area and French tourist arrivals to Tunisia, and Russian tourist arrivals to Syria.

pattern is needed. To understand the differences, note that here the results concern unexpected output shocks. Thus, the lack of correlation found in the previous subsection may indicate that the relationship between the predictable components of source country output and of tourism flows is very weak.

Domestic output in the representative Mediterranean country grows on impact, the median effect is non-negligible and persistent. The median response of domestic consumption is also positive but more muted, while investments react strongly and display a humped shaped dynamic. The median response of net-exports is zero on impact, but turns negative afterwards. Thus, tourist inflows trigger an increase in investments much more than consumption, making the output effects in the average destination country long lasting.

As we have mentioned, an average measure of the heterogeneity in the dynamic responses is the hyper-variance parameter τ. Its posterior density, which we present in the on-line appendix, is centered around 0.01, indicating a considerable degree of heterogeneity in the five countries we examine. For comparison, the posterior density obtained by Jarocinski (2010) using a group of eastern European countries has zero mass above 0.001.

4.4 Structural evidence: individual country responses

In the individual countries, the response of tourist arrivals is usually positive, but there are differences in the magnitude of the impact response and in the shape of the dynamic effects. For example, a 1% increase in Euro area output contemporaneously increases Euro area tourist arrivals in the median by about 1.5% in Cyprus, by 2.5% in Morocco, by 1% in Tunisia but about by 6% in Syria; the impact response in Turkey is only 0.5% but the median response becomes larger after one year. The similarities in the responses of tourist arrivals to Cyprus, Morocco and Tunisia suggest they compete to attract the same Euro area tourists, while the large response of tourist arrivals to Syria is probably due to the fact that the market is exotic, segmented from the rest, and thus much more sensitive to unexpected income changes in the source country.

The responses of the local variables are also quite heterogeneous. Domestic output responds positively in Cyprus, Tunisia, Syria and Turkey and negatively in Morocco. The latter reaction is puzzling, and may be due to the short sample available. Consumption responses are positive in Cyprus, Syria and Tunisia, negative in Morocco and essentially zero in Turkey. The response of investment is, on the other hand, positive in all countries although its shape varies. Net exports are either positive or insignificant on impact, but negative thereafter in all countries except Cyprus, where they are negative on impact and essentially zero afterwards.

4.5 How important are foreign shocks?

To study how important foreign shocks are for fluctuations in these destination countries and to measure the contribution of tourism shocks to the local fluctuations, we decompose the forecast error variance of each of the endogenous variables into components attributable to the various structural shocks. Table 4, which reports the contribution of the external shocks at horizons 0, 1, 4, and 8, has a few interesting features.

Fluctuations in tourism flows are generally dominated by shocks to tourism itself, with shocks to Euro area output playing a small role. Interestingly, tourism flows are hardly influenced by cycles in the desti-

nation country. Clearly, acts of terrorism or periods of political instability do affect the tourism sector. For example, arrivals in Tunisia fell by about 50% in 2011 as a consequence of the turmoils that occurred during the Arab spring[6]. However, these episodes are either too recent, or their occurrence has been rare in the sample, so that the effects are not measurable in the aggregate.

The pattern of fluctuations in destination country's variables is heterogeneous. At one extreme there is Cyprus, where source country output and tourism shocks each explain in the median around 40% of domestic output fluctuations at the eight years horizon. These shocks have an equally relevant role in determining fluctuations in consumption and net exports. At the other extreme, are Turkey and Syria: here the Euro area output and tourism shocks together account for about one-third of fluctuations in the domestic variables. As we will see next, the conclusion changes when we relate Turkish variables with the Russian output cycles. Morocco and Tunisia are intermediate cases: the role of imported shocks for domestic variables is sizeable and about 50 % of the fluctuations in domestic variables are of foreign origin.

4.6 Some special bilateral relationships

We have already highlighted the special role that output and tourism cycles in the United Kingdom, Russia and France may play for Cyprus, Turkey and Tunisia. In this subsection, we look at the transmission of output and tourism shocks for these three special pairs to see whether the conclusions we have previously reached are confirmed or not.

We estimate Bayesian VARs with the same structure and the same variables we have previously employed, except that the source country output and tourism flows are now from the United Kingdom in the case of Cyprus, France in the case of Tunisia and Russia in the case of Turkey. To be consistent with the approach adopted so far, estimation is Bayesian. We employ an independent Normal-Wishart prior for the parameters as in Koop and Korobilis (2010) and inference is based on a sample of 1000 observations sampled from 130000 draws, after discarding 30000 for burn-in. In order to bring information from the region-wide models into the single-country VARs, the priors for the slope coefficients and the covariance matrix of the residuals are centered at the average posterior values previously obtained. Figure 4 plots the responses and Table 5 displays the forecast error variance decomposition.

For Turkey, the tourism variable reacts strongly on impact and jumps by about 2.5% - recall that with tourist arrivals from the Euro area the jump is insignificant on impact and small compared to other Mediterranean countries. Domestic output, consumption and investment are all positive and significant, and this represents an important change relative to the baseline case of the previous subsection, where all the responses where insignificantly different from zero. Consistently with this evidence, the forecast error variance decomposition assigns a large role to the Russian output shocks: while the median contribution of the Euro area output shock to Turkish output does not exceed 10%, the median contribution of the Russian output shock is 60% contemporaneously and stays around 55% eight years into the future. Two other facts are worth noticing: since the role of the tourism shocks is also large, between 52% and 87 % of domestic

[6]Reuters, US on-line edition: interview with Tunisia Trade and Tourism Minister Mehdi Houas, released on June 15th 2011.

fluctuations at the eight years horizon are of imported nature. Moreover, since half or more of Russian tourist arrivals variability to Turkey is explained by the Russian output shocks, tourism in Russia is much more dependent on income than in the Euro area.

When the UK is the source country for Cyprus, the evidence is broadly comparable to that obtained using Euro area data. The tourism variable jumps on impact by almost 2%, which is very close to the value observed in Figure 3, but the maximal effect is reached three years after the shock. The responses of the domestic variables is muted as compared those following a Euro area output shock: the peak responses of domestic output and investment are about three times smaller and the response of consumption fluctuates around zero. One reason for why these effects are smaller is that Cyprus cycles are well synchronized with the Euro area cycles, but much less so now with the UK cycles. This conjecture is supported by the forecast error variance decomposition which assigns a considerably smaller share of the domestic fluctuations to UK output shocks (about 5%) as compared to Euro area output shocks (about 35%). However, the role of UK tourism shocks is larger: comparing Tables 4 and 5, one can see that independent shocks to the UK tourism variable account for twice as large share of Cyprus output fluctuations as compared to a Euro area tourism shock. Thus, the combined effect of imported shocks on Cyprus output is large, regardless of the source country.

Switching the source country from the Euro area to France for Tunisia has minor consequences on the conclusions we have reached. Tourist flows react more strongly to France output shocks but, relatively speaking, the instantaneous response of domestic output and consumption is muted and larger effects are observed with a lag. The combined effect of France output and tourism shocks on Tunisia output, consumption and investments is roughly the same as the one of the Euro area at longer horizons, but the importance for Tunisia output and investments is smaller at horizon 0 and 1 (30% and 55% as compared to 6% and 37%).

4.7 How important is tourism to transmit output shocks internationally?

Next, we evaluate the role of tourism as a channel of international transmission of output shocks, disentangling the direct and the indirect effects of source country output shocks as described in section 3.1. Figure 5 plots the dynamic response of output with the indirect effect associated to tourism flows (the continuous line is the median and the dotted lines the 68% posterior intervals) and without (starred line). The first plot reports the effect in the representative country. The remaining plots show the effects for individual countries. Table 6 has impact and cumulative multipliers computed at the eight year horizon.

Tourism plays a non-trivial role in the representative country: the median impact response of domestic output in the typical destination country would fall from 0.4 to 0.3 when the tourism channel is shut down. Although the effect is not a-posteriori significant - the counterfactual response remains within the original posterior interval - it is quantitatively important and, at least for the first two years, the counterfactual response is close to the lower bound of the original posterior interval. Furthermore, the persistence of the output response is lower as compared to the baseline case.

The pattern for individual countries is also consistent with the idea that the tourism sector matters in transmitting international cyclical fluctuation in the Mediterranean. Cyprus is the country where this role is more prominent, see Figure 5 and the on-line appendix. Both in the case of Euro area output shocks and UK output shocks, the response of Cyprus output would be considerably smaller at all horizons, if the tourism channel was eliminated. As shown in Table 6, the median cumulative Cyprus output multiplier produced by a Euro area output shock would fall from 1.68 to 1.29 without the tourism channel and the posterior intervals would not overlap. In Morocco, Syria and Turkey the tourist channel looks less crucial. Nevertheless, absent the tourism channel, domestic output fluctuations in the destination country would have been different. For example, in Morocco, the counterfactual output response is more negative in years one and two; in Syria, domestic output is considerably less positive in all periods, resulting in a median cumulative multiplier of 2.72 compared to 3.09 in the baseline case; in Turkey, there is no difference with the baseline on impact, but responses are more negative afterward. Note that for Turkey, the same exercise performed using Russian output data and Russian tourist arrivals, delivers a counterfactual output response that remains below the lower bound of the posterior credible set from horizon zero up to six.

It is important to stress that since source country output and tourism fluctuations are stronger during downturns and since the VAR assigns equal weights to positive and negative shocks, the results presented here should be considered a lower bound for the role that tourism flows may have during economic contractions. Given that the samples contain only one or two recessions, it is very hard to distinguish recessionary and non-recessionary effects with a sufficient degree of precision. Thus, the estimation of a nonlinear model capturing these effects is left for future research.

5 Sensitivity analysis

The analysis so far employed tourist arrivals as our main tourism variable. As mentioned earlier, this is not the ideal measure, but it has the advantage of being available for all five countries. In this section, we examine whether our conclusions change when we use different tourism variables. Data on the number of nights spent by international tourists is available only in Tunisia, for the sample 1988 to 2010, and has information on the source countries which is similar to the data on the number of tourist arrivals[7]. Data on per-capita tourist expenditures is available only in Cyprus and covers the 1995 to 2010 period. Since the sample is considerably shorter than in the baseline experiments, conclusions should be drawn with care. To economize on space, the plots and tables with these two alternative variables are in the on-line appendix.

5.1 Number of nights spent in Tunisia

Data on the number of nights spent is quite volatile but troughs around 1992, 2001 and 2008 are clearly visible. To make the comparison with the evidence in section 4 straightforward, we focus on the number

[7]With respect to the number of observations, the sample of number of nights spent is one year longer. With respect to the number of source countries, there is no information on the number of nights spent for tourists from Spain and Luxembourg.

of nights spent by tourists from the Euro area and from France. As in section 4.2, we extract the cyclical component by taking first differences of the original data.

Fluctuations in the number of nights spent both by European and French tourists are similar to those obtained using the number of tourist arrivals, both qualitatively and quantitatively. For example, the growth rate of the number of nights spent by European tourists has been negative in all years from 2006 to 2010, with the exception of a slightly positive value observed in 2008. The largest drop is in 2009; negative values are observed from 2000 to 2003 and before the 1992 recession. When one looks at the number of nights spent by French tourists, the conclusions are similar, but negative fluctuations in coincidence with recessionary episodes are milder, probably because the strong social and economic ties make large slumps in tourism flows from France unlikely, even during downturns.

Given the similarities in the time series pattern of tourist arrivals data and number of nights spent, static and dynamic correlations with source country and destination country output are practically unchanged.

There are a few differences in the shape of the responses the structural analysis delivers, but previous conclusions are, by and large, confirmed[8]. The conclusions obtained from the forecast error variance decomposition are also similar: median posterior estimates are obviously different, but the 68% posterior credible sets often overlap.

5.2 Per-capita expenditures in Cyprus

Per-capita expenditures by tourists in Cyprus is comparable across countries and around 700 euro on average. Russian tourists are the biggest spenders, as their per-capita expenditures exceed 1000 euro for several years in the sample. Since the Russian tourist phenomena is relatively new in Cyprus, we focus on expenditures made by tourists from the United Kingdom and the Euro area.

The comovements between output in the source country and expenditures are strong and the same tendency to jointly fall during economic slowdowns that characterizes the number of tourist arrivals is also present. For example, we observe negative growth rates in 2000 and 2001 for British tourists and positive, although sensibly smaller compared to previous years, rates in 2001 and 2002 for European tourists. The magnitude of the contraction of per-capita expenditure during the recent recession is around 10%.

The contemporaneous correlation between Euro area output and per-capita expenditures is larger than the one observed in the case of tourist arrivals, confirming the superior ability of per-capita expenditures to capture fluctuations in households' disposable income over the cycle. Contrary to the case of tourist arrival data, dynamic correlations are relatively similar across frequencies, but this may be spuriously due to the fact that sample is shorter.

The responses estimated with expenditure data are very close to those obtained using tourist arrivals

[8] Here we do not have the luxury of using a random coefficient Bayesian VAR as we have data only for one country. To make the analysis comparable, we specify the prior distribution on the coefficients of the VAR to be centered at the average posterior coefficients estimated from the random coefficient Bayesian VAR model - thus reflecting the assumption that the underlying economic effects should be similar, even though different tourism data is used - and letting the variance of the prior to be relatively large to allow the data to deviate from the prior is needed.

data. In particular, the impact response of per-capita expenditure to a source country output shock is similar to the one obtained with tourist arrival data, indirectly confirming that expenditures data is artificially constructed combining the duration of the stay abroad with a notional measure of average daily expenditures. The forecast error variance decomposition shows that per-capita expenditures are in large part driven by idiosyncratic shocks, as is the case with tourist arrival flows, but assigns a smaller role to tourism shocks in driving fluctuations of domestic output and consumption in the destination country.

6 Conclusions

The literature has been concerned for a while with the international transmission of shocks and with the channels through which spillovers occur. In many regions of the world, the trade and the financial channels are strong and fluctuations over time in their size appear to be responsible for the pattern of convergence or decoupling observed in the cyclical fluctuations around the world (see Imbs (2004), Kose and Prasad (2010)). The few studies which have looked at cyclical fluctuations in the Mediterranean have found instead that trade and financial channels are not important and that similarities and differences in the cyclical fluctuations in the region are more related to institutional and cultural factors.

The Mediterranean however is a cradle of tourism: in many countries tourism revenues are a large portion of the service account balance; tourism related activities account for a significant fraction of total employment; and, as the Arab spring demonstrates, reductions of tourism flows can cause important welfare losses in the destination economies.

This paper examines the magnitude of imported fluctuations and attempts to quantify the importance of the tourism channel for the international transmission of cyclical fluctuations to the Mediterranean. We use five destination countries and a number of source countries to provide broad evidence on the link and employ alternative measures of tourism flows to make sure that the results we obtain are robust. The analysis reaches four main conclusions.

First, output shocks in the source country generate important fluctuations in international tourism flows. Thus, the luxury good characteristics of international tourist flows is confirmed. Our analysis shows that the link is obscured if unconditional correlations are considered and the predictable part of the fluctuations is not filtered out of the data. In addition, we show that the reaction of tourism flows to income shocks is much stronger in recessions than in expansions. Second, tourism is an important channel of international transmission of output shocks. For example, if the tourist channel were wiped out, the output effects in a typical destination country would be reduced by one-fourth. Third, shocks to tourist arrivals unrelated to income fluctuations in the source country are also important for destination countries output. While disturbances of this type may have to do with preferences for certain location, aggressive marketing strategies, and political instabilities, it is clear that making tourism flows more predictable will improve the ability of destination countries to effectively deal with tourists flows and reduce the downside risks for the local communities. Fourth, in the five destination countries we consider, imported shocks explain a considerable fraction of the

variability of domestic variables.

Our work is the first that systematically investigates the role of the tourism channel for the international transmission of cyclical fluctuations. As all pioneer contributions, it suffers from a number of data limitations. For example, we were able to collect data of comparable quality only for five countries in the Mediterranean region and the available series (number of tourist arrivals) is not the most informative. In addition, the samples are generally short and some of the economies we consider are not necessarily ideal for studying the international transmission of cyclical fluctuations, as idiosyncratic elements are very strong. Moreover, there seems to be a stronger relationship between income in the source country and tourist flows in recessions, but we are unable to exploit this observation in our analysis because the data is short. Hopefully, longer time series, more reliable data for a larger number of source and destination countries, and better recording practices will make studying the contribution of tourism flows to international cyclical fluctuations much easier in the future.

There are many avenues for future research that this paper opens. First, our evidence indicates the need to build international business cycle models where tourism flows, tourism competition and marketing strategies play an important role. Disregarding this channel of transmission may hamper our understanding of how shocks in a large country are transmitted to a small open economy and bias the measurement of other channels of propagation. Second, the counterintuitive pattern of transmission observed in Morocco calls for more international evidence on the role of the tourism channel in other regions of the world. Third, the conclusions we reach call into question European policies trying to improve the integration of the Mediterranean into the EU. Policy actions should not be devoted only to establish stronger trade links; fostering the tourist relationships may help to integrate faster Mediterranean economies with the EU and may have long lasting beneficial output effects because of the virtuous investment cycle they ignite. Investigations studying the best way to achieve the integration goal with a given amount of resources, and the welfare consequences of different policies are likely to improve our understanding of the problem and rationalize policy choices better. Finally, the evidence we have provided is also useful to design development strategies in countries like those of the Middle East, where tourism flows are potentially important but currently hampered by political and religious disputes.

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Table 1: Tourism data

Destination country	Source country	Arrivals	Nights	Expenditures
Cyprus	Euro area	1980 - 2010	- - - -	1995 - 2010
	United Kingdom	1980 - 2010	- - - -	1995 - 2010
	Russia	1994 - 2010	- - - -	1995 - 2010
Morocco	Euro area	1992 - 2009	- - - -	- - - -
	United Kingdom	1992 - 2009	- - - -	- - - -
	France	1992 - 2009	- - - -	- - - -
Syria	Euro area	1985 - 2008	- - - -	- - - -
	United Kingdom	1985 - 2008	- - - -	- - - -
	Russia	1995 - 2008	- - - -	- - - -
Tunisia	Euro area	1988 - 2010	1987 - 2010	- - - -
	United Kingdom	1988 - 2010	1987 - 2010	- - - -
	France	1988 - 2010	1987 - 2010	- - - -
Turkey	Euro area	1984 - 2011	- - - -	- - - -
	United Kingdom	1984 - 2011	- - - -	- - - -
	Russia	1998 - 2011	- - - -	- - - -

Notes: ”Arrivals ” refers to number of tourist arrivals registered at the border; ”Nights ” refers to number of nights spent by tourists; ”Expenditures ” refers to per-capita tourist expenditures. Frequency is always annual.

Table 2: Unconditional cross-correlations

Output in SC & Arrivals in MED	Lags or leads (in years)				
	-2	-1	0	1	2
EA - CY	$0.352*$	0.109	$0.202*$	0.003	$-0.286*$
UK - CY	0.042	-0.011	$0.215*$	0.189	0.116
EA - MA	0.039	$0.198*$	0.146	0.120	0.199
FR - MA	0.027	$0.268*$	$0.297*$	$0.401*$	$0.291*$
EA - SY	$0.410*$	-0.052	-0.096	$-0.274*$	-0.209
RU - SY	-0.097	-0.115	$0.505*$	$0.628*$	$0.570*$
EA - TN	$0.308*$	-0.047	0.029	-0.041	-0.132
FR - TN	$0.347*$	-0.015	$0.149*$	-0.065	-0.308
EA - TR	$0.237*$	$-0.164*$	0.060	0.147	-0.045
RU - TR	-0.172	-0.233	$0.387*$	$0.298*$	-0.202
Arrivals in MED & Output in MED	**Lags or leads (in years)**				
	-2	-1	0	1	2
EA - CY	0.033	-0.167	$0.585*$	0.027	$0.366*$
UK - CY	$0.335*$	0.025	$0.704*$	$0.229*$	$0.274*$
EA - MA	$0.719*$	0.252	0.116	0.234	0.198
FR - MA	$0.607*$	0.130	-0.001	0.186	$0.230*$
EA - SY	$0.414*$	0.157	$0.233*$	$-0.322*$	0.170
RU - SY	$0.181*$	0.055	0.295	$0.694*$	$0.180*$
EA - TN	$0.347*$	-0.115	$0.425*$	-0.478	0.069
FR - TN	$0.398*$	-0.108	$0.353*$	$-0.490*$	0.081
EA - TR	0.052	$-0.235*$	$0.349*$	-0.195	0.108
RU - TR	-0.209	-0.010	$0.559*$	-0.279	0.450
Output in SC & Output in MED	**Lags or leads (in years)**				
	-2	-1	0	1	2
EA - CY	$0.274*$	$0.161*$	$0.632*$	$0.361*$	-0.162
UK - CY	-0.115	0.031	$0.420*$	$0.378*$	0.091
EA - MA	$-0.270*$	0.011	0.057	-0.041	0.247
FR - MA	$-0.273*$	0.050	0.074	-0.077	0.193
EA - SY	-0.182	$-0.398*$	-0.056	-0.065	$0.143*$
RU - SY	$0.267*$	0.183	-0.054	$0.672*$	$0.309*$
EA - TN	$-0.252*$	$-0.189*$	$0.303*$	$0.417*$	-0.041
FR - TN	-0.095	$-0.250*$	$0.286*$	$0.395*$	0.028
EA - TR	$0.179*$	0.117	0.220	-0.120	-0.276
RU - TR	-0.013	0.169	$0.528*$	-0.207	$-0.356*$

Notes: The numbers in the table represent $corr(x_t, y_{t+i})$, where $i = [-2,\ -1,\ 0,\ 1,\ 2]$, x_t is the varaible listed first and y_t is the variable listed second. The sample length varies across pairs: see Table 1 for details. The top panel computes correlations between output in the source country (SC) and tourist arrivals in the destination country (MED); the middle panel computes correlations between tourist arrivals and output in the destination country (MED); the bottom panel computes correlations between output in the source country (SC) and in the destination country (MED). Starred values mean that the 68% confidence intervals do not include zero. Confidence intervals are computed from 500 bootstrapped replications of the sample cross-correlation. Country codes: EA is Euro area; UK is United Kingdom; RU is Russia; CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey.

Table 3: Dynamic correlations

Output in SC & Arrivals in MED	Frequencies	
	0	$\frac{\pi}{2}$
EA - CY	0.452	0.116
UK - CY	0.311	0.275
EA - MA	0.303	0.084
FR - MA	0.633	0.197
EA - SY	-0.346	-0.200
RU - SY	0.694	0.266
EA - TN	0.185	-0.165
FR - TN	0.232	0.011
EA - TR	0.429	-0.064
RU - TR	0.490	0.470
Arrivals in MED & Output in MED	**Frequencies**	
	0	$\frac{\pi}{2}$
EA - CY	0.756	0.327
UK - CY	0.907	0.539
EA - MA	0.731	-0.375
FR - MA	0.566	-0.433
EA - SY	0.619	-0.053
RU - SY	0.859	0.150
EA - TN	0.517	0.096
FR - TN	0.624	-0.003
EA - TR	0.217	0.145
RU - TR	0.641	0.389
Output in SC & Output in MED	**Frequencies**	
	0	$\frac{\pi}{2}$
EA - CY	0.866	0.588
UK - CY	0.382	0.520
EA - MA	0.027	0.110
FR - MA	0.039	0.138
EA - SY	-0.367	0.034
RU - SY	0.767	-0.373
EA - TN	0.236	0.374
FR - TN	0.373	0.261
EA - TR	0.095	0.307
RU - TR	0.337	0.652

Notes: Frequencies centered at zero capture comovement in the long run; frequencies around $\pi/2$ coincide with business cycles of about four years. The sample length varies across pairs: see Table 1 for details. The top panel computes dynamic correlations between output in the source country (SC) and tourist arrivals in the destination country (MED); the middle panel computes dynamic correlations between tourist arrivals and output in the destination country (MED); the bottom panel computes dynamic correlations between output in the source country (SC) and in the destination country (MED). Country codes: EA is Euro area; UK is United Kingdom; RU is Russia; FR is France; CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey.

Table 4: Forecast error variance decomposition

Cyprus	Time horizon (in years)			
	0	1	4	8
EA tourism				
Shock1	4	5	9	12
	(1,8)	(3,10)	(5,15)	(7,19)
Shock2	96	93	85	80
	(92,99)	(88,96)	(78,91)	(72,87)
CY output				
Shock1	32	34	35	34
	(25,41)	(27,43)	(26,44)	(25,43)
Shock2	26	29	35	38
	(20,33)	(23,36)	(27,44)	(30,48)
CY consumption				
Shock1	47	44	36	34
	(27,65)	(26,61)	(23,50)	(23,46)
Shock2	14	20	34	38
	(5,28)	(11,34)	(22,46)	(27,50)
CY investment				
Shock1	34	33	34	33
	(21,46)	(21,45)	(21,46)	(22,45)
Shock2	4	5	7	9
	(1,9)	(3,9)	(4,12)	(5,14)
CY net Exports				
Shock1	21	20	20	21
	(9,39)	(10,31)	(12,31)	(12,31)
Shock2	24	34	38	40
	(9,42)	(21,50)	(27,53)	(28,53)

Morocco	Time horizon (in years)			
	0	1	4	8
EA tourism				
Shock1	32	30	29	29
	(20,43)	(20,40)	(20,39)	(20,38)
Shock2	68	65	59	58
	(57,80)	(54,75)	(47,70)	(45,68)
MA output				
Shock1	15	18	20	21
	(8,27)	(10,29)	(11,29)	(13,33)
Shock2	5	13	26	29
	(2,11)	(8,21)	(17,38)	(18,41)
MA consumption				
Shock1	13	23	29	30
	(6,24)	(13,37)	(17,44)	(17,44)
Shock2	13	11	12	16
	(5,23)	(5,20)	(6,22)	(8,26)
MA investment				
Shock1	44	26	27	28
	(27,61)	(16,39)	(19,40)	(20,40)
Shock2	21	25	25	26
	(11,35)	(15,37)	(16,36)	(16,38)
MA net Exports				
Shock1	11	17	19	21
	(4,21)	(9,26)	(12,29)	(14,31)
Shock2	53	37	37	39
	(34,68)	(25,49)	(26,49)	(27,52)

Syria	Time horizon (in years)			
	0	1	4	8
EA tourism				
Shock1	13	20	26	28
	(6,22)	(12,29)	(17,35)	(18,37)
Shock2	87	65	49	46
	(78,94)	(56,73)	(40,59)	(37,57)
SY output				
Shock1	13	18	26	27
	(6,23)	(10,29)	(16,37)	(18,38)
Shock2	5	5	7	8
	(2,10)	(2,9)	(4,11)	(5,13)
SY consumption				
Shock1	9	9	14	16
	(3,18)	(4,18)	(7,22)	(9,26)
Shock2	6	7	9	9
	(3,13)	(4,13)	(5,15)	(6,16)
SY investment				
Shock1	16	24	46	48
	(6,32)	(15,37)	(36,57)	(38,58)
Shock2	11	9	12	14
	(4,24)	(5,18)	(7,18)	(9,21)
SY net Exports				
Shock1	8	17	21	24
	(3,17)	(10,25)	(13,31)	(15,33)
Shock2	6	8	13	13
	(2,12)	(5,14)	(8,21)	(9,21)

Tunisia	Time horizon (in years)			
	0	1	4	8
EA tourism				
Shock1	5	6	9	10
	(2,10)	(3,11)	(5,14)	(6,16)
Shock2	95	93	85	83
	(90,98)	(88,96)	(79,90)	(76,89)
TN output				
Shock1	22	27	30	29
	(14,32)	(19,36)	(20,40)	(20,40)
Shock2	6	10	13	13
	(2,13)	(6,16)	(8,20)	(9,21)
TN consumption				
Shock1	14	18	23	24
	(6,26)	(10,30)	(14,36)	(15,37)
Shock2	15	15	16	16
	(7,24)	(8,24)	(9,25)	(10,25)
TN investment				
Shock1	12	21	31	32
	(5,23)	(13,32)	(20,44)	(21,44)
Shock2	43	24	19	19
	(30,57)	(16,36)	(12,27)	(13,27)
TN net Exports				
Shock1	24	22	22	23
	(10,45)	(12,35)	(14,33)	(15,34)
Shock2	45	57	55	52
	(28,65)	(43,69)	(44,66)	(40,63)

Turkey	Time horizon (in years)			
	0	1	4	8
EA tourism				
Shock1	3	4	6	7
	(1,6)	(2,7)	(3,10)	(4,11)
Shock2	97	93	87	84
	(94,99)	(89,96)	(81,92)	(78,90)
TR output				
Shock1	4	4	6	8
	(2,9)	(2,9)	(3,10)	(4,12)
Shock2	15	15	14	14
	(9,23)	(9,22)	(9,21)	(8,21)
TR consumption				
Shock1	4	5	8	9
	(2,10)	(2,10)	(4,13)	(5,15)
Shock2	8	10	11	11
	(3,17)	(5,17)	(6,18)	(6,18)
TR investment				
Shock1	4	4	5	7
	(1,7)	(2,8)	(3,9)	(4,11)
Shock2	8	9	11	11
	(3,13)	(4,14)	(6,16)	(6,17)
TR net Exports				
Shock1	3	6	10	10
	(1,7)	(4,10)	(6,15)	(6,16)
Shock2	4	8	10	10
	(1,9)	(5,13)	(6,14)	(6,15)

Notes: The first column indicates the countries considered and the relevant variables in the VAR. "Shock1 " is output shock in the source country; "Shock2 " is tourism shock. The numbers in parenthesis are the lower and upper 68% posterior credible intervals. Country codes: EA is Euro area; CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey. The tuorism variable is Tourist Arrivals.

Table 5: Forecast error variance decomposition, case studies

Cyprus	Time horizon (in years)			
	0	1	4	8
UK tourism				
Shock1	4	6	15	16
	(2,8)	(3,11)	(9,22)	(9,25)
Shock2	96	93	79	74
	(92,98)	(88,96)	(71,87)	(64,83)
CY output				
Shock1	4	9	13	14
	(2,7)	(5,14)	(8,20)	(8,22)
Shock2	42	50	61	64
	(35,49)	(43,56)	(53,69)	(54,73)
CY consumption				
Shock1	10	13	19	17
	(4,18)	(8,21)	(13,26)	(12,23)
Shock2	4	7	20	36
	(1,9)	(3,11)	(13,26)	(27,46)
CY investment				
Shock1	5	9	27	28
	(2,10)	(6,14)	(20,36)	(21,36)
Shock2	16	19	17	18
	(9,26)	(10,28)	(11,24)	(12,25)
CY net exports				
Shock1	32	25	24	24
	(15,55)	(14,39)	(16,34)	(17,33)
Shock2	31	24	31	37
	(13,53)	(14,38)	(21,43)	(25,48)

Tunisia	Time horizon (in years)			
	0	1	4	8
FR tourism				
Shock1	11	12	18	20
	(6,19)	(6,19)	(12,24)	(14,26)
Shock2	89	86	78	74
	(81,94)	(79,92)	(71,83)	(67,80)
TN output				
Shock1	4	9	15	19
	(1,8)	(6,14)	(11,21)	(14,25)
Shock2	2	25	26	25
	(1,6)	(18,33)	(19,34)	(19,33)
TN consumption				
Shock1	5	23	41	40
	(2,10)	(14,32)	(32,50)	(31,50)
Shock2	20	21	20	21
	(9,31)	(13,29)	(13,27)	(14,28)
TN investment				
Shock1	8	9	24	26
	(3,15)	(5,15)	(17,30)	(20,33)
Shock2	29	23	22	23
	(19,41)	(16,31)	(17,30)	(17,29)
TN net exports				
Shock1	13	13	14	16
	(4,25)	(7,22)	(9,22)	(11,24)
Shock2	46	49	51	49
	(28,63)	(37,63)	(39,63)	(38,61)

Turkey	Time horizon (in years)			
	0	1	4	8
RU tourism				
Shock1	56	58	59	60
	(46,67)	(47,68)	(49,68)	(50,69)
Shock2	44	39	35	33
	(33,54)	(29,49)	(27,46)	(24,42)
TR output				
Shock1	60	56	53	55
	(49,69)	(45,65)	(41,64)	(44,66)
Shock2	6	9	14	13
	(2,12)	(5,15)	(8,22)	(8,21)
TR consumption				
Shock1	48	52	53	56
	(34,61)	(40,64)	(42,64)	(44,67)
Shock2	17	18	20	19
	(9,28)	(10,27)	(12,31)	(11,29)
TR investment				
Shock1	64	59	56	57
	(51,74)	(47,69)	(45,66)	(45,68)
Shock2	8	11	19	18
	(4,15)	(7,20)	(12,28)	(11,27)
TR net exports				
Shock1	24	33	35	38
	(9,41)	(19,47)	(22,46)	(25,50)
Shock2	14	25	31	28
	(6,28)	(16,35)	(22,42)	(19,40)

Notes: Left: Cyprus. Middle: Tunisia. Right: Turkey. The first column indicates the countries considered and the relevant variables in the VAR. "Shock1 " is output shock in the source country; "Shock2 " is tourism shock. The numbers in parenthesis are the lower and upper 68% posterior credible intervals. Country codes: UK is United Kingdom; RU is Russia; FR is France; CY is Cyprus; TN is Tunisia; TR is Turkey. The tourism variable is Tourist Arrivals.

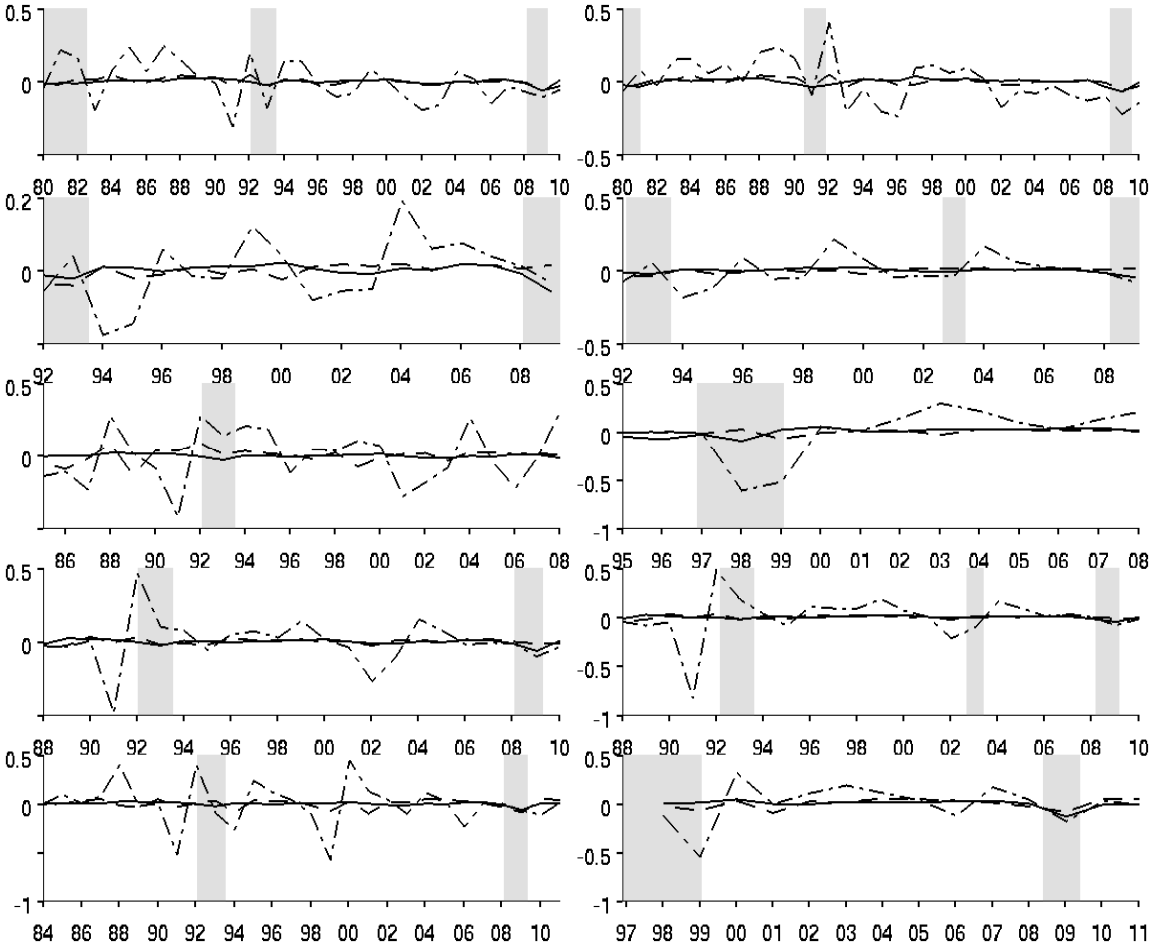
Table 6: Output multipliers

	Impact Multiplier		Cumulative Multiplier	
	Baseline	Counterfactual	Baseline	Counterfactual
Average	0.40 (0.30,0.53)	0.29 (0.17,0.40)	0.63 (0.44,0.79)	0.49 (0.31,0.65)
Cyprus	0.92 (0.78,1.04)	0.76 (0.65,0.86)	1.68 (1.56,1.75)	1.29 (1.15,1.41)
Morocco	-0.27 (-0.37,-0.17)	-0.30 (-0.42,-0.18)	-0.13 (-0.50,0.14)	-0.35 (-0.84,-0.05)
Syria	1.53 (0.91,2.09)	1.16 (0.59,1.77)	2.72 (2.25,2.96)	3.09 (3.19,3.28)
Tunisia	0.39 (0.30,0.47)	0.36 (0.27,0.44)	0.50 (0.28,0.63)	0.46 (0.25,0.62)
Turkey	0.44 (0.18,0.69)	0.40 (0.17,0.62)	0.13 (-0.32,0.47)	-0.08 (-0.52,0.31)

Notes: Impact multipliers in the baseline case are constructed as the value at time zero of the domestic output impulse response in the destination country divided by the value at time zero of the Euro area output shock. Cumulative multipliers in the baseline case are constructed as the sum over time of the value of the domestic output impulse response in the destination country divided by the sum over time of the value of the Euro area output shock. Under the counterfactual scenario, the tourism channel is closed. The tourism variable is Tourist Arrivals. In parenthesis are 68% posterior credible intervals.

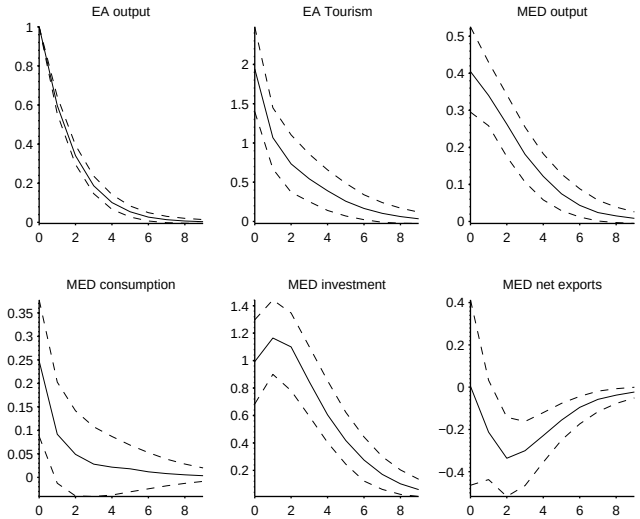
Figures

Figure 1: Cyclical fluctuations



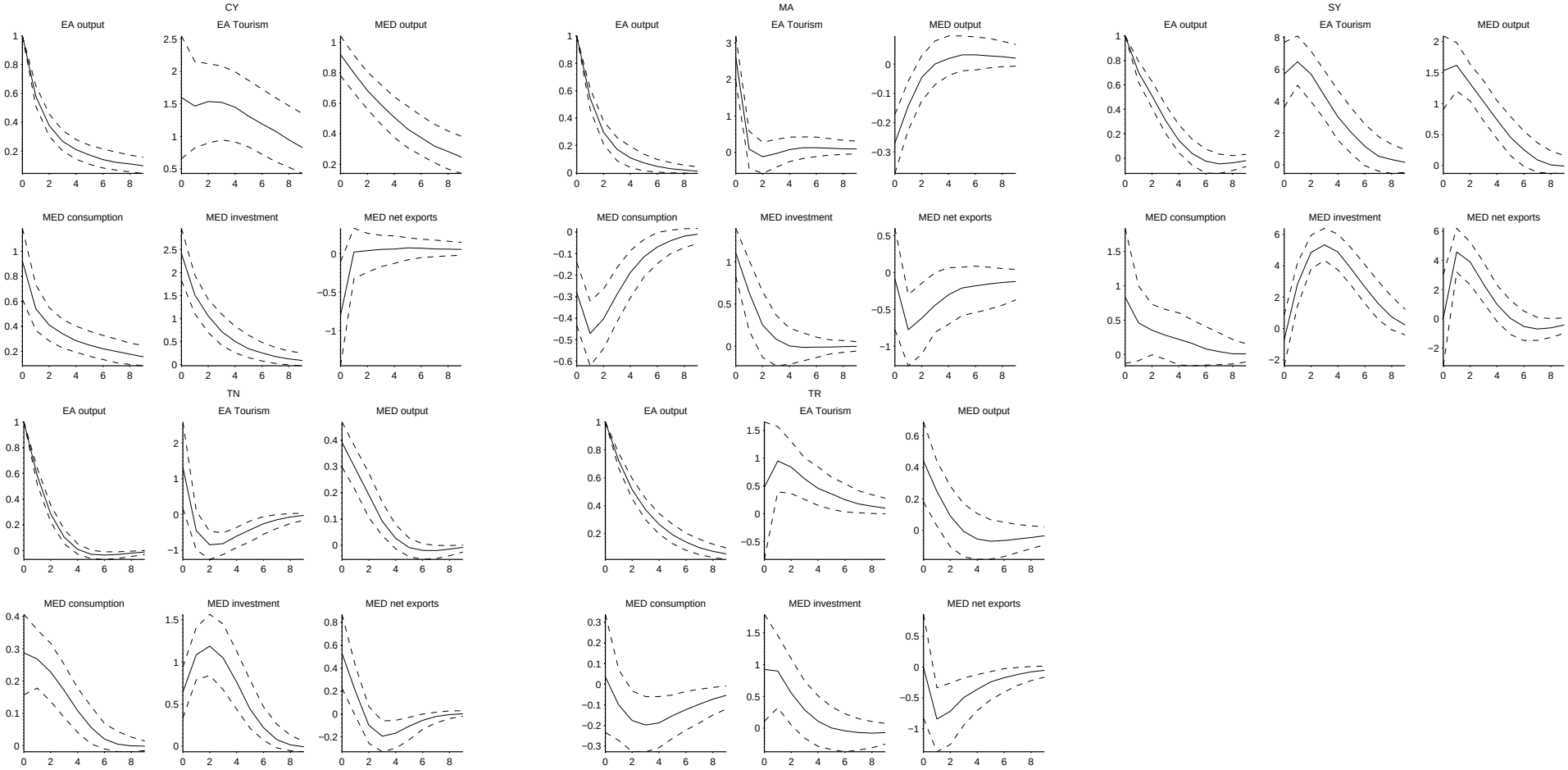
Notes: From left to right: CY-EA, CY-UK; MA-EA, MA-FR; SY-EA, SY-RU; TN-EA, TN-FR; TR-EA, TR-RU. Dashdotted line: annual changes of (log) tourist arrivals. Continuous and dashed lines: annual changes of the source country and destination country (log) output respectively. Shaded regions: recessions. Country codes: EA is Euro area; UK is United Kingdom; FR is France; RU is Russia; CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey.

Figure 2: Responses to a Euro area output shock, average effect



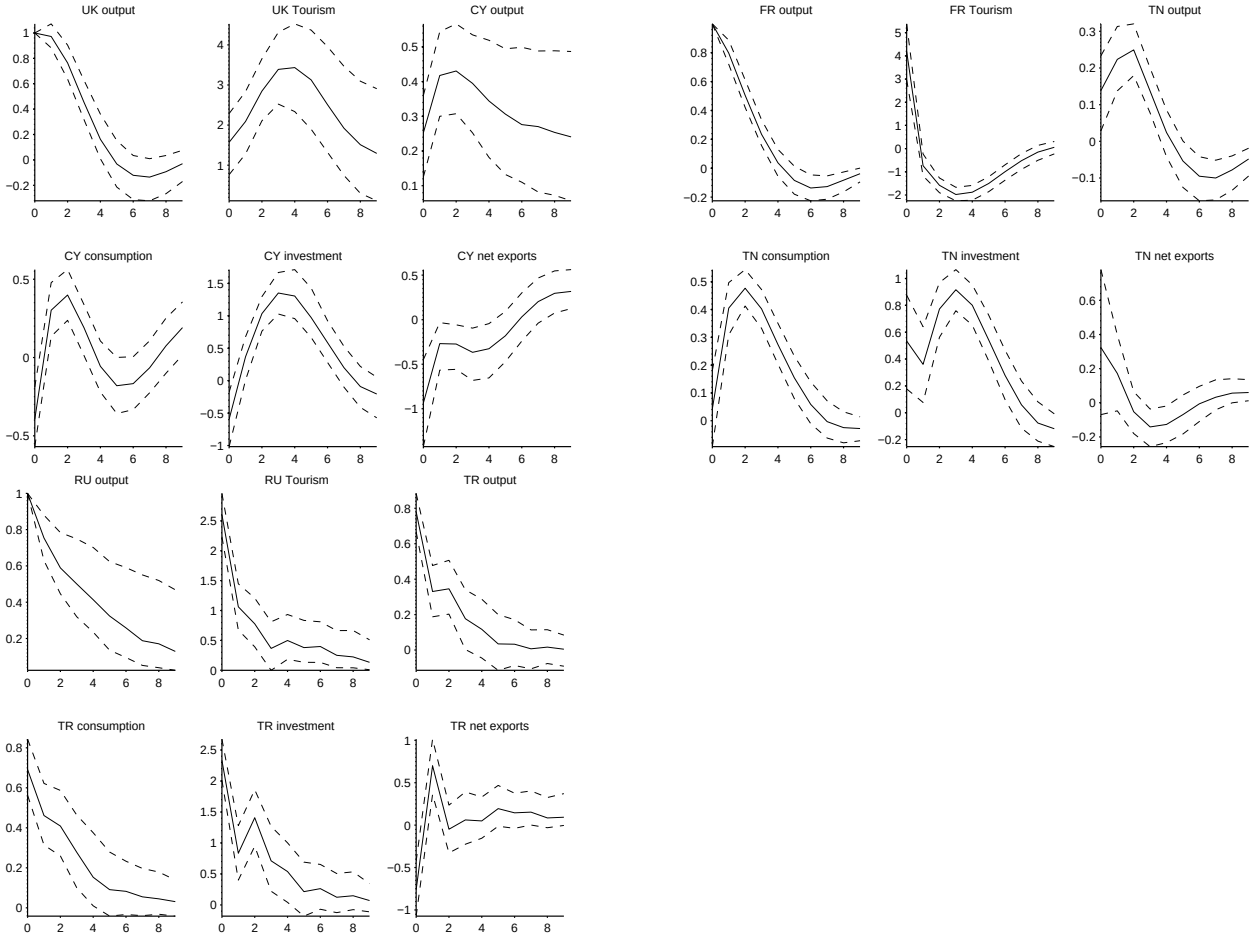
Notes: Continuous line: median posterior IRF. Dotted lines: 68% posterior credible interval. The order of the plots is the following: Euro area output, Euro area tourist arrivals, MED output, MED consumption, MED investment, MED net exports. Here, MED identifies the typical destination country.

Figure 3: Responses to a Euro area output shock, individual country effects



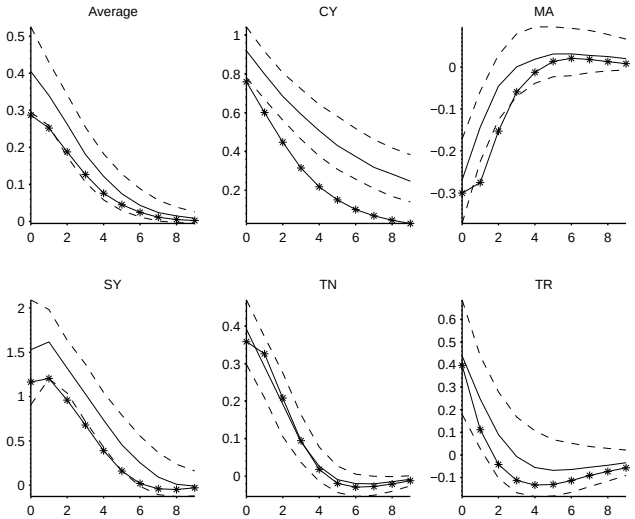
Notes: Top panel, from left to right: Cyprus, Morocco, Syria. Bottom panel, from left to right: Tunisia, Turkey. Continuous line: median posterior IRF. Dotted lines: 68% posterior credible interval. The order of the plots is the following: Euro area output, Euro area tourist arrivals, MED output, MED consumption, MED investment, MED net exports. Here, MED identifies the relevant destination country. Country codes: EA is Euro area; CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey.

Figure 4: Responses to source country output shocks, case studies



Notes: Top panel, left: Cyprus. Top panel, right: Tunisia. Bottom panel: Turkey. Continuous line: median posterior IRF. Dotted lines: 68% posterior creidible interval. The order of the plots is the following: source country output, source country tourist arrivals, MED output, MED consumption, MED investment, MED net exports. Here, MED identifies either Cyprus or Turkey. Country codes: UK is United Kingdom; RU is Russia; FR is France; CY is Cyprus; TN is Tunisia; TR is Turkey.

Figure 5: Counterfactual destination country output



Notes: Top panel, from left to right: average effect; Cyprus, Morocco. Bottom panel, from left to right: Syria, Tunisia, Turkey. Continuous line: median posterior IRF. Dotted lines: 68% posterior credible interval. Starred line: counterfactual dynamic response of the destination country output without the tourism channel. Country codes: CY is Cyprus; MA is Morocco; SY is Syria; TN is Tunisia; TR is Turkey.The tourism variable is Tourist Arrivals.