DETERMINANTS OF REGIONAL BUSINESS CYCLE SYNCHRONIZATION IN GREECE

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Abstract

This study assesses the determinants of regional business cycles synchronization in Greece vis-à-vis the Greek reference business cycle. We concentre on NUTSII annual data for the period 2005-2018. The time-varying synchronization is estimated using a multivariate GARCH model and subsequently we employ a panel regression model to evaluate its determinants. The findings show that investments and unemployment are the two key determinants, based on the GVA business cycle synchronizztion. We have also assessed the determinants of unemployment synchronization and the results show that the level of imports and the disposable income are its main drivers, along with the status of a region as being touristic.

Keywords: Business Cycle, Synchronization, Dynamic correlation

JEL Classifications: E32, F44.

1. Introduction

Since the seminal work on Optimum Currency Areas (OCA) by Mundell (1961) to be followed by McKinnon (1963) and Kenen (1969), a vast literature has emerged on business cycles synchronization, given that the latter is a pre-requisite for the well-functioning of a common currency area. The earlier studies in this line of research were developed even before the inception of the euro currency, with the notable works by Eichengreen (1990), De Grauwe and Vanhaverbeke (1993) and Fatas (1997), who assessed whether Europe could form an OCA. Later, numerous studies attempted to answer the question if the member-states of the European Monetary Union (EMU) or the European Union (EU) exhibit synchronized business cycles[1]. Nevertheless, the study of synchronized business cycles has also extended to countries beyond EMU or EU[2].

Furthermore, research assesses the main drivers of business cycles synchronization, with the bilateral trade intensity, dis(similarily) of industrial structure, financial integration, fiscal stance, political ideologies, globalization and distance between countries being among the most identified factors[3].

Beyond the wealth of evidence in favor or against the synchronization of EMU or EU member-countries' business cycles, extensive research has focused on the synchronization at regional level. Sala-i-Martin (1996) was the first study to assess regional business cycle synchronization focusing on 73 NUTSII EU regions, 47 US regions, 10 Canadian provinces and 47 Japanese prefectures, showing an increased level of convergence over time among regions. Subsequently, studies, Rodríguez-Pose and Fratesi (2007), using NUTSII data for EU countries, examined how the regional business cycles are synchronized with the national cycle, providing evidence of pro-cyclical regional disparities, as regions are more dependent on transfers or public investment and employment. More recently, Gadea et al. (2017) investigated the evolution of regional economic interlinkages in Europe at NUTSII level, using GDP data

[1] For instance, the reader is directed to the works by De Haan et al. (2002), Altavilla (2004), Camacho et al. (2008), Koopman and Azevedo (2008), Papageorgiou et al. (2010), Aguiar-Conraria and Soares (2011), Soares (2011), Artis et al. (2011), Mink et al. (2011), Crespo-Cuaresma et al. (2013), Lee (2012), Degiannakis et al. (2014) and Camacho et al. (2019).

[2] For example, Kose et al. (2008) studies the global business cycles, Bergman et al. (2011) looks at the Scandinavian region, Jiménez-Rodríguez et al. (2013) focus on the Central and Eastern European countries, whereas the studies by Lange (2017) and Leiva-Leon (2017) study the American continent with their focus being in Canada and the US, respectively.

[3] See, Kalemli-Ozcan et al. (2001), Kose et al. (2003), Imbs (2004), Imbs (2006), Inklaar et al. (2008), Cerqueira and Martins (2009), Cerqueira and Martins (2011), Montinari and Stracca (2016), Degiannakis et al. (2016), Bunyan et al. (2020).

for 213 NUTSII regions in 18 EU countries. Their findings show that (i) in just two years, the Great Recession synchronized Europe twice as much as the European Union integration process did over several decades; (ii) Ile de France is the region acting as the main channel for the transmission of business cycle shocks in Europe; followed by Inner London and Lombardi; and (iii) they identified a nonlinear relationship between sectoral composition and regional synchronization, which was amplified in the wake of the Great Recession. Camacho et al. (2017) results are at par with those by Gadea et al. (2017). Their findings, focus on 17 NUTSII regions for Spain, and show substantial increase in the regional business cycles synchronization in the post-Great Recession period. More recent work by Gomez-Losko et al. (2019), using annual real GDP data for NUTSII regions corresponding to 16 European countries, reports, though co-movements among regions are relatively low, an increasing trend in the level of synchronization after the Great Recession.

Although it is rather more common for studies to use NUTSII data for the examination of regional business cycles synchronization, there are studies that focus on NUTSI or NUTSIII regions (see, for instance, Acedo-Montoya and de Haan, 2008; Montoya and De Haan, 2008; Marino, 2013; Beck, 2016; Bandrés et al., 2017) showing, on one hand, that synchronization has increased over time and, on the other hand there seems to exist a national border effect.

The present study develops further the inquiry on regional business cycles synchronization and its main drivers, focusing on the Greek regions. There is only one other published work, Panteladis and Tsiapa (2014), on the regional business cycles synchronization for Greece. Their study uses the Pearson correlation with 8-years rolling window on data from 1980 to 2008 at the NUTSII and NUTSIII level too. The study, approximates a time-varying correlation measure. The study shows that the business cycles of the NUTSIII regions are more synchronized with the NUTSII level rather than the national business cycle. The industrial dissimilarity, similarity in manufacturing specialization, similarity in input-output linkages and agglomeration economies appear to be the drivers of synchronization or de-synchronization.

Our work extends the current literature in several ways. First, we use a robust of time-varying synchronization measure, using a multivariate GARCH model in the same fashion with Degiannakis et al. (2014, 2016). Second, we consider beyond trade intensity, industry similarity, distance to be prominent drivers of synchronization, other important determinants not been considered till now by the related literature (regional characteristics in terms of tourist destinations, island vs non-island regions, regional savings and disposable income, as well as public spending on regions).

The rest of the paper is organized as follows. Section 2 describes the data that are used in the present study, along with the data sources. Section 3 provides a detailed discussion of the data construction, whereas Section 4 describes the methodology that is employed in this research. Section 5 analyses the empirical findings before Section 6 concludes the study and provide the policy implications.

2. Data description

Our data basis consist of annual data over the period 2005-2018 for the 13 Greek regions. The current study focuses on the drivers of business cycle synchronization between the average domestic national reference business cycle and the business cycles of the 13 regions, see Table 1. Our sample has a total of 156 region-years. Monetary values are expressed in constant prices of 2005. Our data basis has been retrieved from Eurostat, Greek Statistical Authority, Greek Exporters Association, Ministry of Finance, Association of Greek Tourism Enterprises and Bank of Greece.

Table 1: List of variables used in the study

Variable's name	Acronym	Description	Source
Regional Gross Value Added	GVA_i	Gross Value Added of each Greek region *i*, in million euros	Greek Statistical Authority & Eurostat
Greek Gross Value Added	GVA_{GR}	Gross Value Added of Greece, in million euros	Greek Statistical Authority & Eurostat
Regional unemployment rate	UN_i	Unemployment rate of each Greek region *i*	Greek Statistical Authority
Greek unemployment rate	UN_{GR}	Unemployment rate of Greece	Greek Statistical Authority
Distance	DIS	Distance between Athens and the capital city of each region, in Km	Authors' own calculation
Island region	ISL	Dummy variable that takes the value of 1 if the region is primality an island region and 0 otherwise	Authors' own calculation
Tourism region	TOUR	Dummy variable that takes the value of 1 if the region attracts a significant number of tourists and 0 otherwise	Authors' own calculation based on data from the Association of Greek Tourism Enterprises
Size of regional industrial sectors	$IND_{k,i}$	Industrial GVA for each region (Industries included: Agriculutral, Mining, Construction, Trade, Communication, Financials, Real Estate, Professional Services, Public Administration, Recreation), in million euros	Greek Statistical Authority & Eurostat
Size of Greek industrial sectors	$IND_{k,GR}$	Industrial GVA of Greece (Industries included: Agriculutral, Mining, Construction, Trade, Communication, Financials, Real Estate, Professional Services, Public Administration, Recreation), in million euros	Greek Statistical Authority & Eurostat

Industrial dissimilarity index	IND_DISS	Krugman's industrial dissimilarity index. It takes values between 0 and 1.	Authors' own calculation
Regional imports	IMP	Regional imports, as a % of regional GVA	Greek Statistical Authority & Greek Exporters Association
Regional exports	EXP	Regional exports, as a % of regional GVA	Greek Statistical Authority & Greek Exporters Association
Regional investments	INV	Regional investments, as a % of regional GVA	Greek Statistical Authority
Regional savings	SAV	Regional savings, as a % of regional GVA	Bank of Greece
Regional disposable income	DISP_INC	Regional disposable income as a % of regional total income	Eurostat
Public spending in each region	PUB_SPEND	Public spending in each region, as a % of regional GVA	Ministry of Finance

3. Data Construction

3.1 Dependent variable

To assess the drivers of business cycle synchronization, we first need to extract the cyclical component of the regional and Greek-wide GVA. The cyclical component is extracted using the Hodrick-Prescott filter. Next, we use this cyclical component to estimate the time-varying business cycle synchronization between region *i* and the Greek-wide reference cycle.

We define as $\boldsymbol{y}_t = (y_{i,t}, \quad y_{GR,t})'$ the bivariate vector for $y_{i,t}$, $i = 1, \dots, 13$, being the business cycle of region i and $y_{GR,t}$ denoting the Greek-wide reference cycle at year t. The generalized form of a system that enables us to compute the dynamic estimation of business cycle synchronization is:

$$\begin{aligned} \boldsymbol{y}_t &= \boldsymbol{\mu}_t + \boldsymbol{\varepsilon}_t \\ \boldsymbol{\varepsilon}_t &= \boldsymbol{H}_t^{1/2} \boldsymbol{z}_t \\ \boldsymbol{z}_t &\sim N(\boldsymbol{z}_t; \boldsymbol{0}, \boldsymbol{I}) \\ \boldsymbol{H}_t &= \sigma(\boldsymbol{I}_{t-1}), \end{aligned} \tag{1}$$

where $\boldsymbol{\mu}_t$ denotes the conditional to the available information at time $t-1$ mean of $\boldsymbol{y}_t$, $\boldsymbol{H}_t$ is the conditional covariance matrix of $\boldsymbol{\varepsilon}_t \equiv \boldsymbol{y}_t - \boldsymbol{\mu}_t$, $\boldsymbol{z}_t$ is a process with $E(\boldsymbol{z}_t) = \boldsymbol{0}$, $E(\boldsymbol{z}_t \boldsymbol{z}_t') = \boldsymbol{I}$, $N(\boldsymbol{z}_t; \boldsymbol{0}, \boldsymbol{I})$ is the bivariate standard normal density function and $\sigma(.)$ is a positive measurable function of the past information set, $\boldsymbol{I}_{t-1}$.

The business cycle synchronization between region *i* and the Greek-wide reference cycle is the dynamic correlation coefficient which is estimated as:

$$BCS_{i,GR,t} = \frac{\sigma_{i,GR,t}}{\sqrt{\sigma_{i,t}^2 \sigma_{GR,t}^2}}, \tag{2}$$

where $\sigma_{i,t}^2$ and $\sigma_{GR,t}^2$ are the diagonal elements of $\boldsymbol{H}_t$, and $\sigma_{i,GR,t}$ is the non-diagonal element of $\boldsymbol{H}_t$.

One of the most straight forward specifications to estimate the $\boldsymbol{H}_t = \sigma(\boldsymbol{I}_{t-1})$, which guarantees the $\boldsymbol{H}_t$ to be positive definite and does not require the estimation of any parameters of $\boldsymbol{H}_t$, is the multivariate Riskmetrics® model proposed by J.P. Morgan (1996).

The covariance matrix of the multivariate Riskmetrics model is defined as:

$$\boldsymbol{H}_t = (1-\lambda)\boldsymbol{\varepsilon}_{t-1}\boldsymbol{\varepsilon}_{t-1}' + \lambda \boldsymbol{H}_{t-1}, \tag{3}$$

where $0 < \lambda < 1$ is a scalar.

The bivariate Riskmetrics analytically has the form:

$$\begin{gathered}\begin{pmatrix} y_{i,t} \\ y_{GR,t} \end{pmatrix} = \begin{pmatrix} \beta_1 \\ \beta_2 \end{pmatrix} + \begin{pmatrix} \varepsilon_{i,t} \\ \varepsilon_{GR,t} \end{pmatrix} \\ (\varepsilon_{1,t} \quad \varepsilon_{2,t} \quad \cdot \quad \cdot \quad \cdot \quad \varepsilon_{15,t})' = \boldsymbol{H}_t^{1/2}(z_{1,t} \quad z_{2,t} \quad \cdot \quad \cdot \quad \cdot \quad z_{15,t})' \\ (z_{i,t} \quad z_{GR,t})' \sim N(\boldsymbol{0}, \boldsymbol{I}) \\ \boldsymbol{H}_t = \begin{pmatrix} \sigma_{i,t}^2 & \sigma_{i,GR,t} \\ \sigma_{i,GR,t} & \sigma_{GR,t}^2 \end{pmatrix} = (1-\lambda)\begin{pmatrix} \varepsilon_{i,t} \\ \varepsilon_{GR,t} \end{pmatrix}(\varepsilon_{i,t} \quad \varepsilon_{GR,t})' + \lambda \boldsymbol{H}_{t-1}.\end{gathered} \tag{4}$$

The BCS between the regional cycles and the Greek-wide reference cycle is shown in Figure 1.

Figure 1: Business Cycle Synchronization between the Greek reference cycle and the 13 prefectures of Greece, 2005-2018.

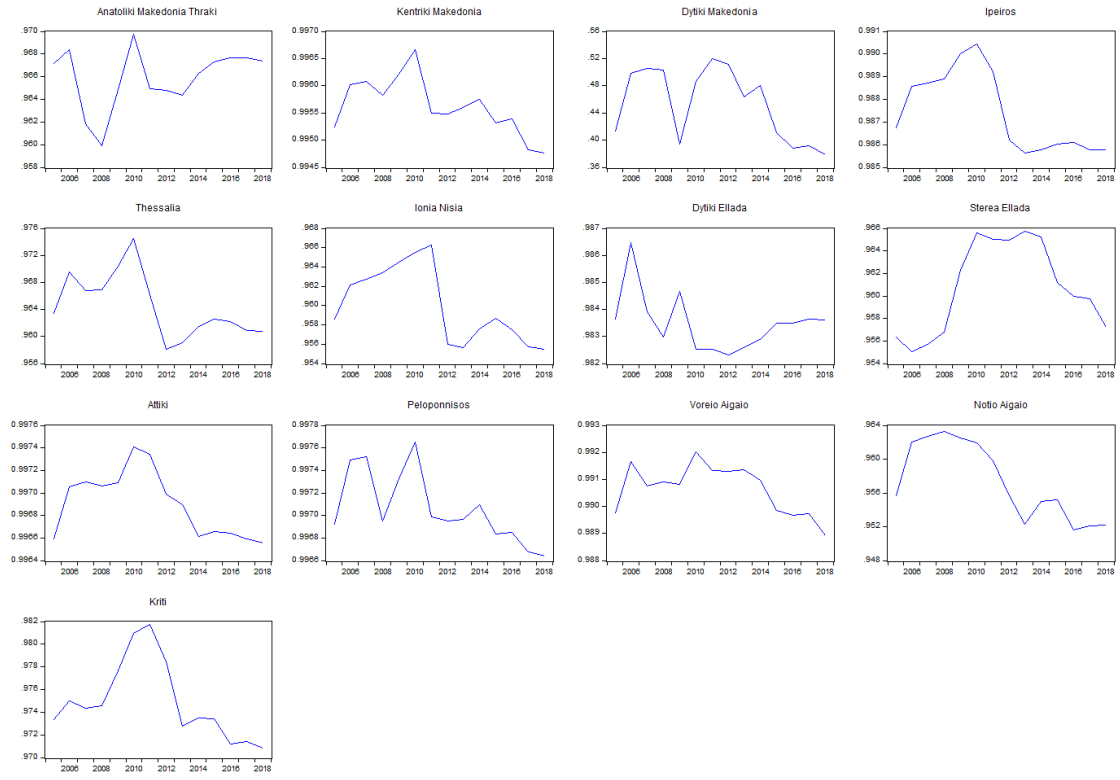


Figure 1 shows the presence of a very high level of BCS between each region's cycle and the Greek-wide reference cycle. More specifically, the level of synchronization fluctuates between 0.94 and 1. However, there is a notable exception, this of Dytiki Macedonia, which presents the lowest level of synchronization with the Greek-wide reference cycle, with a fluctuation between 0.36 and 0.52. In almost all cases, the peak in the level of synchronization in observed during 2010, which is in line with our a-priori expectations as it marks the start of the Greek debt crisis. However, following the year 2010, according to Figure 1 results, it is quite interesting to a decoupling behavior, albeit the high correlation level.

3.2. Drivers of synchronization

Our set of drivers of business cycle synchronization includes tourism (TOUR), island (ISL), distance (DIS), industrial dissimilarity index (IND_DISS), imports (IMP), exports (EXP), investments (INV), savings (SAV), disposable income (DISP_INC) and public spending (PUB_SPEND), which are either dummy variables or monetary values expressed as a percentage of the regional GVA.

The IND_DISS is the only variable that has been constructed by the authors. More specifically, we use the Krugman's industrial dissimilarity index (Krugman, 1991), which captures the level of industrial specialization between each region and Greece. The index has been constructed as:

$$IND\_DISS_{i,GR,t} = \sum_{k}^{K} \left| S_{k,i,t} - S_{k,GR,t} \right|, \qquad (5)$$

where, $S_{k,i,t}$ denotes the share of industry (IND) *k* in region's *i* GVA, in year *t* and $S_{k,GR,t}$ is the share of industry (IND) *k* in year *t* for the whole Greek GVA. The range of values that this index takes is between 0 and 1, with values close to 0 suggesting similar industrial structure between region *i* and Greece.

4. Methodology

In this part, we provide methodological details in regard with the panel regression applied in this research project. The main purpose of this study is the investigation of the potential drivers of regional business cycle synchronization (BCS) between the 13 Greek regional cycles and the Greek-wide reference cycle. To do so, a panel regression model of the following form is estimated:

$$BCS_{i,GR,t} = \beta_0 + \alpha BCS_{i,GR,t-1} + \sum_{j=1}^{M} \boldsymbol{\beta_j} \boldsymbol{X}_{i,t}^{(j)} + u_{i,t} + \varepsilon_{i,t}, \quad (6)$$

where, $BCS_{i,GR,t}$ denotes the level of business cycle synchronization in year *t*, $\boldsymbol{X}_{i,t}^{(j)}$ is the vector of explanatory variables (M=11), $u_{i,t}$ is the between-region error and $\varepsilon_{i,t}$ is the within-region error. α is the coefficient of the lagged dependent variable and $\boldsymbol{\beta_j}$ denotes the vector of coefficients of the explanatory variables that need to be estimated.

The panel regression includes random effects[4], which means that the variation across regions is assumed to be random and uncorrelated with the explanatory variables and all the necessary tests have been applied. The GLS method has been used for the estimation of the model. It is also noted that the standard errors of the panel regression are robust. The number of observations of those panel regressions is 156 (regions x years). We shall reiterate that the set of the explanatory variables consists of the following variables: the first lag of the dependent variable, tourism (TOUR), island (ISL), distance (DIS), industrial dissimilarity index (IND_DISS), imports (IMP), exports (EXP), investments (INV), savings (SAV), disposable income (DISP_INC) and public spending (PUB_SPEND).

5. Empirical analysis

Starting our analysis with the panel regression results based on the BCS as the dependent variable, the estimation results show that only the first lag of *BCS*, *INV* and *UNEMP* are statistically significant (see Table 2).

Table 2: Determinants of Business Cycle Synchronization between the Greek reference cycle and the 13 regions of Greece, 2005-2018.

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LAG1_BCS	.665	.154	4.31	0	.363	.967	***
TOUR	-.014	.013	-1.12	.265	-.04	.011	
ISL	.011	.017	0.67	.504	-.021	.044	
DIS	0	.003	0.12	.907	-.005	.005	
IND_DISS	-.133	.082	-1.62	.105	-.293	.028	
IMP	0	0	0.10	.92	0	0	
EXP	.014	.026	0.52	.6	-.037	.065	
INV	-.413	.23	-1.79	.073	-.865	.038	*
SAV	.031	.04	0.77	.439	-.047	.108	
DISP_INC	-.004	.029	-0.14	.892	-.061	.053	
PUB_SPEND	.01	.011	0.94	.347	-.011	.032	
UNEMP	-.415	.247	-1.68	.094	-.899	.07	*
Constant	.501	.225	2.22	.026	.059	.942	**
Mean dependent var		0.938	SD dependent var			0.141	
Overall r-squared		0.820	Number of obs			156	

[4] The inclusion of random and not fixed effects is indicated by the Hausman test.

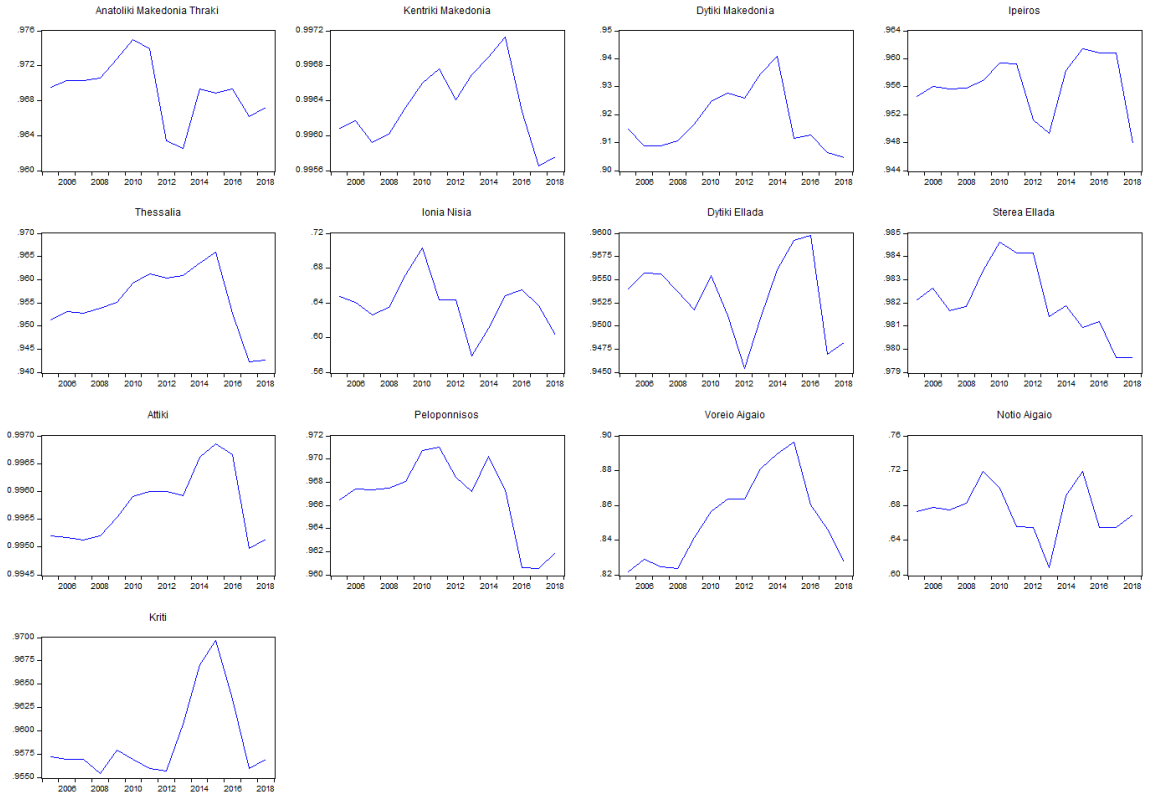
Chi-square	27610.544	Prob > chi2	0.000
R-squared within	0.004	R-squared between	0.971

*** p<.01, ** p<.05, * p<.1

UMEMP has the expected negative sign revealing the higher level of regional unemployment tends to cause a deviation of that region's GVA cycle from the Greek-wide reference cycle. By contrast, as far as the *INV* is concerned, we report an unanticipated negative effect on *BCS*. Possibly what we observe here is that increased level of investments (% of regional GVA) could cause a decoupling of *BCS*, if equivalent country-wide investment activity does not follow suit.

Having analysed the baseline results, we face an important limitation, which could distort our findings. This limitation is related to the narrow fluctuations of the *BCS*, which are always close to 1, except for Dytiki Macedonia, as we have already mentioned. Thus, our findings could be driven by outlier of Dytiki Macedonia in our sample.

Figure 2: Unemployment Synchronization between the Greek reference cycle and the 13 prefectures of Greece, 2005-2018.



Thus, we estimate Eq.6 using the unemployment synchronization (*UNS*), as our dependent variable. The level of synchronization between the regional and Greek unemployment rates is estimated in the same fashion as in the business cycle synchronization.

This choice is motivated by Barrios and Barrios and De Lucio (2003), Belke and Heine (2006), Marino (2013), Duran and Ferreira-Lopez (2017) and Lange (2017) who also use employment data rather than GVA data in their studies.

Figure 2 demonstrates the level of *UNS* for the 13 Greek regions. An initial observation that we can make is that there is a significant larger fluctuation in *UNS* relatively to *BCS*, with the wider range to be evident in Ionia Nisia, followed by Notio Aigaio. By contrast, the higher correlation levels are observed in Attiki, Sterea Ellada and Kentriki Macedonia.

Table 3 demonstrates the results related to the *UNS*. We note that apart from the lagged dependent variable, the ISL, IMP and DISP_INC variables also exhibit a significant effect on *UNS*.

The findings suggest that island regions exhibit lower level of synchronization, which was also evident in Figure 2. On the other hand, IMP and DISP_INC exert a positive effect on *UNS*.

Typical drivers of regional synchronization, as were suggested by the related literature, do not seem to play a significant role in the case of Greece. In particular, the industrial structure, the level of exports or public spending are not among the significant determinants of synchronization. Even more, despite the fact that Greece is a major tourist destination, we do not observe tourist regions' business cycles to deviate from the Greek-wide business cycle.

Table 3: Determinants of Unemployment Synchronization between the Greek reference cycle and the 13 regions of Greece, 2005-2018.

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
LAG1_UNS	.329	.117	2.80	.005	.099	.559	***
TOUR	-.015	.027	-0.56	.578	-.069	.038	
ISL	-.094	.044	-2.12	.034	-.181	-.007	**
DIS	-.008	.005	-1.54	.125	-.019	.002	
IND_DISS	-.067	.048	-1.39	.166	-.161	.028	
IMP	0.00	0.00	-6.88	0.00	0.00	0.00	***
EXP	.037	.031	1.20	.231	-.024	.098	
INV	.013	.032	0.40	.686	-.05	.076	
SAV	.004	.034	0.12	.902	-.063	.071	
DISP_INC	.094	.05	1.88	.061	-.004	.191	*
PUB_SPEND	-.008	.01	-0.79	.428	-.027	.012	
Constant	.636	.148	4.31	0.00	.347	.926	***

Mean dependent var	0.910	SD dependent var	0.114
Overall r-squared	0.811	Number of obs	156
Chi-square	7867.154	Prob > chi2	0.000
R-squared within	0.008	R-squared between	0.852

**** p<.01, ** p<.05, * p<.1*

6. Conclusion

The purpose of the present paper was to develop further the inquiry on regional business cycles synchronization and its main drivers, focusing on Greece. The present work extends the current literature in several ways: by using a robust measure of time-varying synchronization measure, using a multivariate GARCH model and by considering, not only the most frequently identified drivers of synchronization (trade intensity, industry similarity, distance), also important other determinants that have not been considered by the related literature (regional characteristics in terms of tourist destinations, island vs non-island regions, regional savings and disposable income, as well as public spending on regions).

The used data are expressed in annual frequency over the period 2005-2018 for the 13 Greek regions. The set of drivers of business cycle synchronization includes tourism (TOUR), island (ISL), distance (DIS), industrial dissimilarity index (IND_DISS), imports (IMP), exports (EXP), investments (INV), savings (SAV), disposable income (DISP_INC) and public spending (PUB_SPEND). All variables are either dummy variables or monetary values that are expressed as a percentage of the regional GVA (Gross Value Added).

To assess the drivers of business cycle synchronization, it was first extracted the cyclical component of the regional and Greek-wide GVA. The cyclical component is extracted using the Hodrick-Prescott filter. Subsequently, we used this cyclical component to estimate the time-varying business cycle synchronization between region *i* and the Greek-wide reference cycle. The methodology adopted was a panel regression model. The panel regression included random effects, which means that the variation across regions was assumed to be random and uncorrelated with the explanatory variables and all the necessary tests have been applied. The GLS method has been used for the estimation of the model.

The panel regression results, based on the model specification, where BCS is the dependent variable, show that only the first lag of *BCS*, *INV* and *UNEMP* are statistically significant. *UMEMP* has the a-priori expected negative sign revealing the higher level of regional unemployment tends to cause a deviation of that region's GVA cycle from the Greek-wide reference cycle. By contrast, as far as the *INV* is concerned, we reported an unanticipated negative effect on *BCS*. Possibly what we observe here is that increased level of investments (% of regional GVA) could cause a decoupling of *BCS*, if equivalent country-wide investment activity does not follow suit. Having analysed the baseline results, we were faced an important limitation, i.e., that or narrow fluctuations of the *BCS*, which are always close to 1, except for Dytiki Macedonia. Thus, our findings could be driven by outlier of Dytiki Macedonia in our

sample. Therefore, we re-specified the model using the unemployment synchronization (*UNS*), as the dependent variable. The level of synchronization between the regional and Greek unemployment rates is estimated in the same fashion as in the business cycle synchronization. The results show that apart from the lagged dependent variable, the ISL, IMP and DISP_INC variables also exhibit a statistically significant effect on *UNS*. The findings suggest that island regions exhibit lower level of synchronization. On the other hand, IMP and DISP_INC exert a positive effect on *UNS*. Typical drivers of regional synchronization, as were suggested by the related literature, do not seem to play a significant role in the case of Greece. In particular, the industrial structure, the level of exports or public spending are not among the significant determinants of synchronization. Even more, though Greece is a major tourist destination, we do not observe tourist regions' business cycles to deviate from the Greek-wide business cycle, this might be since most of the inputs to the tourist demand comes from all over Greece.

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