ISSN 2443-8030 (online)

Croatia's Tourism Industry – Part 2: Curse or Blessing?

Kristian Orsini and Mario Pletikosa

ECONOMIC BRIEF 047 | JULY 2019

EUROPEAN ECONOMY

Economic and Financial Affairs

European Economy Economic Briefs are written by the staff of the European Commission's Directorate-General for Economic and Financial Affairs to inform discussion on economic policy and to stimulate debate.

The views expressed in this document are solely those of the author(s) and do not necessarily represent the official views of the European Commission.

Authorised for publication by Carlos Martínez Mongay, Deputy Director-General for Economic and Financial Affairs.

This paper exists in English only and can be downloaded from https://ec.europa.eu/info/publications/economic-and-financial-affairs-publications_en.

Luxembourg: Publications Office of the European Union, 2019

PDF ISBN 978-92-79-77376-1 ISSN 2443-8030 doi:10.2765/07914 KC-BE-18-015-EN-N

European Commission
Directorate-General for Economic and Financial Affairs

Croatia's Tourism Industry – Part 2: Curse or Blessing?

By Kristian Orsini and Mario Pletikosa

Abstract

Despite a generally benevolent view on the positive economic impact of tourism, some economists have long argued that a bloated tourism sector may crowd out other industries. The phenomenon is reminiscent of the Dutch Disease and is therefore sometimes dubbed the Beach Disease. The debate around it has often neglected the fact that while the impact of tourism on other tradable sectors may well be negative, its overall economic impact tends to be more ambiguous. In this paper, we distinctly analyse the two dimensions. Our results indicate that tourism development in Croatia is not likely to crowd out other tradable sectors. However, tourism is also unlikely to be as important for long-run growth as trade openness. These findings can be ascribed to the peculiarities of the Croatian tourism sector and already discussed in a previous Economic Brief on tourism in Croatia*, including a high leakage rate via imports and a limited impact on employment, which insulate tourism from the rest of the economy and limits potential positive (or negative) spillovers.

(*) Kristian Orsini and Vukašin Ostojić, Economic Brief 36, 2018, Tourism Industry: Beyond the Sun and Sea. https://ec.europa.eu/info/publications/economy-finance/croatias-tourism-industry-beyond-sun-and-sea_en.

Acknowledgements: We are grateful to Laura Bardone, Manfred Bergmann, Francesca Maria D'Auria, Mona Papadakou and Antonio Sanchez-Pareja for useful comments and suggestions on an earlier draft.

Contact: Kristian Orsini, European Commission, EU Delegation to the United States, Economic and Financial Affairs, kristian.orsini@eeas.europa.eu; Mario Pletikosa, European Commission, Directorate-General Migration and Home Affairs, National programmes for South and East Europe, mario.pletikosa@ec.europa.eu.

1. Introduction

Tourism makes up a large share of Croatia's economy. From a national accounts perspective, revenue from tourism-related services provided to foreign persons is recorded under exported services and, as such, is a demand component of GDP. One of the most commonly used indicators for assessing the size of tourism is therefore the share of international tourism-related receipts in a country's economic output. At almost 20% in 2018, this share is one of the highest worldwide and comfortably exceeds that in other tourism-intense economies in the Northern Mediterranean, with Malta and Cyprus ranking as distant second and third. What is more, as discussed in the previous Economic Brief covering the tourism sector in Croatia, the demand for Croatian tourism services is expected to keep increasing in the coming years, particularly as rapid income growth in Central and Eastern European economies opens up the affordability of international travel to a growing number of households (Orsini and Ostojić, 2018).

Whereas most economists and policymakers regard the high and growing inflow of tourists as a key driver of the Croatian economy, and therefore hold a generally positive view on its impact, relatively few studies have thoroughly assessed its impact on the Croatian economy. From a measurement perspective, the net contribution of the tourism sector is something different than its share in GDP.[1] In the case of Croatia, high seasonality, a large share of overnights in the lower value-added private accommodation segment and low levels of per-capita tourist spending limit multiplier effects due to a high leakage rate which mainly reflects a large import content of tourism services.[2] The repatriation of profits by foreign-owned enterprises also tends to limit the positive contribution of tourism-related receipts.

More fundamentally, as argued by some economists, tourism may have the undesirable effect of crowding out other tradable sectors and even accelerate the process of deindustrialisation. Differently from what has been argued by some economists (Broz and Dubravcic, 2011), this is not bad *per se*. In a properly functioning market economy, resources tend to flow towards more productive sectors. In the absence of externalities, a reallocation of capital and labour towards tourism driven by higher productivity would ultimately be welfare-improving, at least at aggregate level. The displacement of resources towards one sector at the expense of another may nevertheless have significant distributional implications, both in geographical terms and in terms of personal income distribution – especially since significant shares of tourism receipts tend to accrue to rents. Moreover, strategic considerations are also relevant in as far as policymakers may wish to maintain the domestic manufacturing base in order to reduce the economy's reliance on imported goods.

The issue becomes more complicated in the presence of externalities. The key concept – as the word suggests – is that positive or negative effects generated by the activity of a sector may not be internalised by that sector, but are diffused to another sector or the whole economy. As a consequence, the allocation of resources generated by market forces may be sub-optimal and state intervention towards a welfare-improving allocation of resources is justified. For example, if the costs of congestion and pollution created by the inflow of tourists are not borne exclusively by firms in the tourist sector, their profitability will be higher than it would be if the costs were fully internalised. The sector would then attract a greater amount of resources than optimal. Conversely, if tourism were to generate substantially positive externalities, for example, by familiarising international visitors with local products that they could then start importing upon return to their home countries, tourism would generate spillover effects that it cannot appropriate. In this case, the level of investment in tourism might be sub-optimal from a social point of view. Beyond these illustrative examples, the relevant question is not simply whether such externalities are overall negative or positive, but also their relative magnitude compared to the externalities exerted by other tradable sectors.

Our analysis aims at assessing potential crowding-out effects and the role of externalities in a consistent econometric framework by testing respectively the degree of interaction between tourism and other sectors (sections 3) and the overall impact of tourism on economic growth (section 4). Before developing the econometric models, section 1 provides a review of recent literature, while section 5 summarises the conclusions and formulates some policy recommendations.

2. Tourism, deindustrialisation and growth: a review of the literature

The literature on the "Dutch Disease" discusses the possibility of a crowding-out effect from extractive industries to manufacturing. The model set up by Corden and Neary (1982) describes how a boom in the exploitation of natural resources can have a negative effect on other tradable sectors, e.g. manufacturing.[3] This occurs because a commodity boom, in the absence of unemployment and with full labour mobility, induces a reallocation of labour towards extractive industries (reallocation effect) through higher wages, and increases spending on domestic non-tradable goods and services (spending effect). In the new equilibrium the manufacturing output is lower and the real exchange rate appreciates.[4]

Copeland (1991) argues that a tourist boom will similarly induce a reallocation of resources toward the otherwise non-tradable goods and services. The model differs from the original framework for the following reasons: (1) as a consequence of tourism, goods and services that are normally non-tradable (such as restaurant meals and hotel accommodation), become partially tradable; (2) tourists typically consume goods and services bundled with "unpriced amenities", such as climate, scenery and other attractions. It follows that: (1) the spending effect acts both indirectly (through higher domestic purchasing power) and directly (since tourists compete with locals in consuming the otherwise non-tradable goods and services); while (2) the income received by the service sector partly incorporates the value of "unpriced amenities". This is an inefficient method of extracting rent from natural amenities, and the gains for the economy from a tourist boom will fall short of their potential.

Real exchange rate appreciation tends to follow and reflects the improvement of the country's terms of trade. Note that in the absence of taxation and distortions such as unemployment, the appreciation of real exchange rate is the only mechanism through which tourism benefits the economy since it improves aggregate purchasing power. Yet, if capital is mobile, rents of the amenities are partially dissipated by entry of foreign capital, which, in the long run, mitigates the terms of trade appreciation through profit repatriation, but also decreases the benefits of tourism. Real exchange rate appreciation may also have an adverse effect on the competitiveness of other tradable sectors (e.g. manufacturing), but in Copeland's model deindustrialisation is mainly an effect of enhanced competition for scarce productive resource: real exchange rate appreciation is a manifestation, not the cause of the loss of cost-competitiveness.

Moreover, Copeland (1991) suggests that tourism booms can have important distributional consequences as large shares of aggregate benefits accrue to the owners of immobile factors specific to the non-tradeable sector, while real return of other factors decreases.

Empirical investigations into the existence of what Holzner (2011) dubbed the Beach Disease are not fully conclusive. Cross-country results suggest that economies with relatively large tourism sectors grow faster and that they do not face risks of excessive currency appreciation. Although the impact on deindustrialisation is less clear, Holzner (2011) concludes against any risk of the Beach Disease. Ghalia and Fidrmuc (2018) adopt a similar multi-country framework and find that dependence on tourism can undermine the competitiveness of the traded sector. Reliance on tourism, they conclude, has a positive impact on growth, except when countries are highly open to both trade and tourism. In both cases, however, the focus on GDP growth is misleading. In Copeland's framework, deindustrialisation coexists with higher output. Ultimately, the higher productivity of the tourism sector is what induces the reallocation of resources.

Some of the single-country analyses focus more narrowly on the mechanisms described by Copeland (1991). Lofti and Karim (2016) find evidence of deindustrialisation triggered by exogenous currency inflows (from tourism receipts, but also foreign aid) in Morocco, while Mieiro et al. (2012) find evidence that the boom of game-related tourism in Macau negatively affected other exporting sectors. Broz and Dubravcic (2011) compare the economic development over the transition years in Slovenia and Croatia and suggest the presence of the Beach Disease in the latter based on the typical symptoms – appreciation of the exchange rate, rise in wages and loss of competitiveness in the manufacturing sector. They conclude that the disease was caused by a synergy of three sources – international tourism revenues, workers' remittances and net capital inflows – but do not test the hypothesis econometrically.

The question of the long-term impact of tourism on economic growth is conceptually distinct and hinges crucially on potential externalities of different productive sectors. As it should be clear from the previous discussion, tourism growth can potentially lead to deindustrialisation, while having an overall positive impact on output. There are a number of reasons why policymakers could find in deindustrialisation a reason of concern. Benefits could end up being skewed towards some groups of people or specific regions. Moreover, increasing dependence on externally produced industrial goods bears geostrategic risks. This is especially true considering that (more than other sectors) tourism is subject to sudden changes in preferences and is exposed to risks of stagnation (Butler, 1980). Deindustrialisation, however, could be negative for an economy even if we make abstraction from these distributional and strategic considerations.

As argued by Copeland (1991), “if external economies are important to economic growth, then a contraction of the industrial sector may have some welfare significance, if the potential external benefits generated by industrial expansion are greater than those generated by expansion of the tourist sector” (p. 527). Whereas this would generally be the case even in the absence of crowding-out effects, a tourism-induced deindustrialisation would further widen the gap between the optimum allocation and the allocation generated by market forces.

The endogenous growth theory highlights the importance of trade in achieving a sustainable rate of economic growth (Balassa, 1978 and Barro and Sala-i-Martin, 1995). The proponents of the export-led growth theory argue that the expansion of exports spurs growth through positive externalities arising from participation in world markets, namely: an improved allocation of existing resources (allocative efficiency); greater capacity utilisation through the use of economies of scale; diffusion of technological progress and absorption of skills. Exports also ease the current account pressures from imports of capital goods by increasing the country’s external earnings and attracting foreign investment.

The tourism-led growth (TLG) theory carries over many of the arguments from the export-led growth literature. Brida et al. (2016) mention several channels through which tourism positively affects economic growth. Tourism revenue relaxes the external budget constraint, potentially allowing the import of capital goods. It also stimulates investment in new infrastructure, it promotes other economic industries by direct, indirect and induced effects and it accelerates the adoption of new technologies. Consequently, not only does tourism not harm growth, but it has the potential – just like a large export sector – to boost the economy’s potential output. Growth of tourism therefore always leads to growth of output. This positive correlation is indeed observed in many studies – including the aforementioned analyses by Holzner (2011) and Ghalia and Fidrmuc (2018).

Some economists, however, have argued that the causal relationship could also run in the opposite direction, with economic growth leading to a surge in tourism (growth-led tourism hypothesis, GLT). This interpretative hypothesis does not question the positive correlation between tourism and economic activity, but argues that it is economic growth that acts as a pull factor on tourism demand. This occurs when economic development itself generates the necessary infrastructure and a critical mass of attractions (shopping, culture, nightlife) that boost the appeal of a city, region or country as a holiday destination. According to Oh (1995) this was clearly the case for tourism development in South Korea.

Empirical research on low-income countries tends to confirm that tourism leads to economic growth, but evidence for mid-income countries is mixed. Brida et al. (2014) give a detailed and systematic overview of approximately one hundred papers on the link between tourism and growth. The TLG hypothesis has been mostly confirmed for the countries across Latin America and Asia. Although only a handful of destinations in Africa and the Middle East have been analysed so far, the TLG hypotheses seems to be confirmed there, as well. Smaller and more advanced Asian economies such as Taiwan and Singapore appear to be an exception, since studies have found a bidirectional relationship (TLG and GLT). Another exception is potentially represented by the UAE, where Shadab (2018) finds a strong evidence of GLT.

Research on Croatia and other Mediterranean economies with very large tourist sectors is less conclusive. The TLG hypothesis has mostly been confirmed for Turkey, while a bidirectional relationship between tourism and growth has been found for Spain (Cortes-Jimenez and Pulina, 2010), Italy (Massidda and Mattana, 2013) and Malta (Katircioglu, 2009). For Greece, Dritsakis (2004) confirms the tourism-led growth hypothesis, but Kasimati (2011) finds no causality. For Spain, Nowak et al. (2007) find evidence that tourism affects growth both directly and indirectly by boosting also the import of productivity-enhancing industrial goods and machinery. Hajdinjak (2014) finds evidence that tourism in Croatia boosts import of capital goods, which in turn supports real GDP growth, though only in the short term. Moreover, the author finds that tourism appears to only boost the import of productive means needed for its own development, and does not affect the import of capital goods needed for the development of other sectors.[5] Mervar and Payne (2010) establish reverse causality between tourism and income in Croatia (GLT), and not *vice-versa.*

In seeking to validate the TLG or GLT hypothesis, economists have often oversimplified the analytical framework and overlooked the crucial issue of the optimal allocation of resources across sectors. In the past two decades, the economic literature has addressed empirically the two hypotheses by trying to establish econometrically the direction of the causality: i.e. whether tourism boosts growth or growth boosts tourism. This focus on causality has been accompanied by a neglect of the theoretical underpinnings of the modelling framework. Brida et al. (2014) overview reveals that most studies simply look at GDP and a proxy variable for tourism (e.g. tourism receipts or arrivals). Others include other variables in an ad-hoc way (e.g. real exchange rates or terms of trade). Some studies use a production function augmented with tourism – arguably a better way to address the issue. As argued by Lütkepohl (1982), the omission of relevant variables can affect conclusions on causality.

More fundamentally, the focus on causality has distracted economists from the most relevant issue from a policy perspective – does a large tourism sector provide for the optimal allocation of resources, or do other sectors generate even larger positive externalities? This requires a well-specified growth model that not only allows to test the direction of causality, but also to estimate the magnitude of the positive impact of tourism relative to that of other tradable sectors. In the following sections we will assess (1) whether Croatia suffers from the symptoms of the Beach Disease and (2) whether tourism is a key driver of economic development – equal to or superior to other sectors.

3. Is Croatia suffering from the Beach Disease?

We model Croatia as a small open economy with two tradable sectors, exporting goods and tourism services. As crowding-out effects occur through the reallocation of resources across sectors, the Beach Disease should ideally be tested by looking at the flow of inputs from the tourism sector to other (tradable) sector(s). Tourism, however, is not an industry according to the classification of economic activities and data on capital and labour inputs is not available. We therefore focus directly on output and model the long-run equilibrium relations and adjustment dynamics for exports of goods and tourism services as a function of international demand and relative prices.

Exports of goods are a proxy for the overall tradable sector. It includes mainly industrial goods, but also processed and unprocessed food and commodities – key sectors for the Croatian economy. We proxy exports of tourism services with total exports of services – as the subset is not readily available. Tourism services represent roughly ¾ of exports of services in Croatia and the composition has changed only marginally through time.[6] By modelling the output of the two sectors jointly we allow for potential cross-sector spillover effects.

We rely on quarterly national account data from 2000 to 2018. Beyond exports of goods (X) and tourism revenues (T), the other key variables of this two-sector model are: the real effective exchange rate, as a proxy for relative prices (P) and the income of trading partners/potential tourists (Y). As Crotia's main trading partners as well as the large majority of its tourists come from the EU (Orsini and Ostojić, 2018), we rely on real GDP in the EU as a proxy of income. The real effective exchange rate is defined as the ratio of the implicit deflator of Croatian exports of goods and services to the implicit deflator of EU GDP – adjusted for the exchange rate. All volume series are chain-linked and seasonally adjusted. The data cover the period from 2000Q1 to 2018Q4.

The equilibrium relations and the adjustment dynamics are modelled as a Vector Error Correction Model (VECM), where all variables potentially interact with each other. The model is presented as follows:

$$(1) \begin{bmatrix} dX_t \\ dT_t \\ dY_t \\ dP_t \end{bmatrix} = \alpha\beta' \begin{bmatrix} X_{t-1} \\ T_{t-1} \\ Y_{t-1} \\ P_{t-1} \end{bmatrix} + \sum_{1=1}^{n} \Gamma_i \begin{bmatrix} dX_{t-i} \\ dT_{t-i} \\ dY_{t-i} \\ dP_{t-i} \end{bmatrix} + \begin{bmatrix} \mu_T \\ \mu_X \\ \mu_Y \\ \mu_P \end{bmatrix} + \begin{bmatrix} \varepsilon_{Xt} \\ \varepsilon_{Tt} \\ \varepsilon_{Yt} \\ \varepsilon_{Pt} \end{bmatrix}$$

The system of equations signifies that the *rate of change* of a given variable at a time *t* (indicated with the prefix *d*) is (potentially) a function of its previous dynamics (i.e. its change at time *t-1*, *t-2*, etc.), as well as the dynamics of the other variables (the operator Γ_i), plus a rate of convergence (measured by the coefficients in the matrix α) towards a number of long-term equilibrium relations (defined in the matrix β), plus a potential stochastic trend (vector μ). This implies that in each period a variable moves as a function of (i) past short-term developments, (ii) a trend, and (iii) the force of attraction towards long-run equilibrium relations. As the movement is not deterministic, but stochastic, each period also contains a random component (vector ε).

In the above system, β represents a matrix of long-run equilibrium relations. The size of the matrix (and hence the number of relations) is not specified ex-ante, but it is determined by the data through appropriate tests. When a matrix is composed of a single vector, crowding-out effects are likely to occur, but this is not the case when it is composed of two vectors. Before performing the tests and analysing the results, let us discuss the main intuition behind the above proposition. Let us assume that Croatia were to suffer from the Beach Disease and consider a surge in the demand for tourism. To satisfy the increased demand, resources would have to move from other sectors to tourism, ultimately resulting in a lower volume of output in the former. This would imply that the total output of the tradable sectors (i.e. both exports of goods and tourism services) would depend on the level of external demand and the relative prices. Consequently a *single long-run relation* would link exports of goods and tourism services with income in trading partners and the real exchange rate. In the absence of such crowding-out effects, however, the increase in tourism services would not have any impact on the exports of goods and vice versa. In this case there would be *two separate long-run relations*: one describing the behaviour of exports of goods and the other describing the behaviour of tourism services.

The Johansen test (which tests for most likely number of long-run relations in the above system of equations) unambiguously points at the existence of two cointegration vectors (see Table 1).[7] This is a **necessary but not sufficient condition** to establish the absence of the Beach Disease. The second necessary condition is that developments in one tradable sector (e.g. goods) can be fully neglected when considering developments in the other tradable sector (e.g. tourism). But before moving to the second part of the test, let us analyse the characteristics of the demand for Croatian exports of goods and tourism services.

Table 1: **Johansen cointegration test, intercept but no trend in CE(s), two lags**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.377	71.410	47.856	0.000
At most 1 *	0.276	36.887	29.797	0.006
At most 2	0.120	13.318	15.495	0.104
At most 3	0.053	4.012	3.841	0.045
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.38	34.52	27.58	0.01
At most 1 *	0.28	23.57	21.13	0.02
At most 2	0.12	9.31	14.26	0.26
At most 3	0.05	4.01	3.84	0.05

Both tests indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors' calculations

Having ascertained that there are two long-run equilibrium relations, we can now estimate the parameters of the model based on the assumption of two cointegration equations (see Table 2). The cointegration vectors in matrix β require a normalisation in order to be more easily interpreted: the first long-run relation is normalised on exports of goods and does not include tourism services; the second one features symmetric properties. The interpretation of the estimated β coefficients in the upper panel of Table 2 is straightforward: parameters can be interpreted as long-run demand elasticities (with the opposite sign). Income elasticity of exports of goods is 4.26, whereas for exports of tourism services it is only 2.59. Thus, if EU GDP increases by 1 percentage point, exports of goods and tourism services increase by 4.26 and 2.59 pps respectively. Inversely, the price elasticity is higher for tourism (-1.97) than for exports of goods (-0.71).

The income elasticity of exports of goods is higher than previous estimates for Croatia. According to Mervar (2003) or Bobić (2010), export elasticity is in the range of 0.9 to 2.4. The IMF (2009), however, finds relatively high income elasticities in other Central and Eastern European countries, ranging from 1.9 for Hungary to a staggering 7 for Slovakia. Price elasticities in the same study range between 0 for the Czech Republic and -0.73 for Poland. The estimates for Croatia appear plausible in comparison.

Tourism income elasticity of 2.59 is a bit above, but not statistically different from the 2.05 found in Orsini and Ostojić (2018) on the basis of a single equation model. The price elasticity is slightly higher, possibly reflecting the inclusion of other cost variables in the latter model (the demand model features a proxy for transportation costs and the relative price for hotel and food services). Overall, the estimated parameters appear highly plausible and fall in the range of previous studies.

Table 2: **VECM – Unconstrained estimates, model (1)**

β	CE1	CE2		
X(-1)	1	0		
T(-1)	0	1		
Y(-1)	-4.26 (0.25) [-16.92]	-2.59 (0.18) [-14.26]		
P(-1)	0.71 (0.29) [2.43]	1.97 (0.21) [9.30]		
C	101.54	40.27		
α	**dX**	**dT**	**dY**	**dP**
CE1	-0.27 (0.13) [-2.04]	0.04 (0.09) [0.51]	0.02 (0.01) [2.64]	-0.11 (0.04) [-2.95]
CE2	0.31 (0.15) [2.06]	-0.43 (0.10) [-4.46]	-0.02 (0.01) [-2.12]	-0.07 (0.04) [-1.69]

Standard errors in ( ) & t-statistics in [ ]
Estimates of autoregressive components and dummies not reported

Source: Authors' calculations

The adjustment dynamics are summarised by the α coefficients in the lower panel. The first row reports the adjustment coefficients of all variables relative to the first long-run relation (exports of goods), while the second row refers to the second long-run relation (exports in services). The adjustment coefficient of EU income (dY) is practically 0 in both rows, which means that EU GDP can be considered as an (weakly) exogenous variable. As one would expect, it is the change in EU GDP that determines how exports of goods and services move in Croatia and not vice versa.

Let us now look at relative prices and exported volumes of goods and tourism services. Consider an exogenous shock to income in the EU: if relative prices were fully exogenous (for example if they were fully determined in the world market and Croatia had no price-setting power at all), they would not change following an increase or decrease in the demand, and all the adjustment would be borne only by the volumes of exports of goods and tourism services (infinite elasticity) – i.e. they too would be exogenous just like the EU GDP. If, on the other hand, the volumes of exports of goods and tourism services were fully inelastic, the coefficients for the rate of adjustment of the latter would be 0 – and excess demand would only result in higher prices. In our model, the coefficient on relative prices is negative and relatively small for exports of goods. In the case of tourism services, the coefficient for prices is not significantly different from 0. This means that prices of tourism services do not react to changes in demand. This suggests that while Croatian firms exporting goods might have some pricing power, Croatian providers of tourism services are essentially price-takers. This probably reflects a relatively high substitution effect from other Mediterranean tourist destinations (due to the weak specificity of the main sea and sun tourism product), but also a high fragmentation (and price competition) amongst service providers.

Exports of goods adjust to their long-run equilibrium with demand fundamentals at a rate of 0.27, while the rate of adjustment of tourism services with respect to their long-run equilibrium is much higher at 0.43.[8] Tourism services therefore appear to adjust more quickly than exports of goods to changes in demand (as indeed one would expect given the aforementioned high fragmentation). As coefficients α represent the rate of conversion in the dynamic system, their inverse corresponds to the number of quarters necessary to "erase" the gap that follows a shock and converge back to equilibrium. In other words, deviations from the long-term equilibrium are wiped out in just over two quarters in the case of tourism, and almost a full year for exports of goods.

The adjustment matrix includes two additional coefficients of core interest for our analysis: they describe how exports of goods adjust to a shock in the demand for tourism services and vice-versa. From the Johansen test, we already know that in the long-run relations there is no interaction between the two sectors. The additional condition to exclude a potential Beach Disease is that exports of goods do not adjust to the disequilibrium in the tourism market and vice-versa. In other words, suppose there is a shock in demand for Croatian tourism services (respectively Croatian exports of goods): the supply of exports of goods (respectively tourism services) is not expected to decrease to meet the excess demand of tourism services.

The coefficients in the adjustment matrix suggest that as the volume of tourism services increases to adjust to the equilibrium, the volume of exports of goods decreases at a rate of 0.31. On the other hand, if the volume of exports of goods increases to adjust to the equilibrium, the volume of tourism services decreases at a rate of 0.04. There is therefore a potential asymmetric crowding-out effect: whereas the tourism sector exerts a crowding-out effect on the exports of goods, the latter exert a negligible (and statistically not different from 0) crowding-out effect on tourism services.

To conclude that tourism does indeed crowd out the tradable sector, we must be able to exclude (with a reasonable level of confidence) that the observed data could not have been generated by a system where such crowding-out effects are absent. To verify this, we estimate a model in which we constrain both cross-sector adjustment coefficients to 0 and test the joint significance of the two coefficients.

From a statistical point of view, the constrained model performs just as well, since the likelihood of the constrained model (where crowding-out effects are excluded) is not statistically different from the likelihood of an unconstrained model (in which we allow for potential crowding-out effects). The corresponding likelihood ratio test, under a null hypothesis that the two models are significantly different, could not be rejected (χ^2=4.19, p=0.12). These tests, coupled with the preceding one, represent **necessary and sufficient conditions.** Accordingly, we conclude that there is no evidence of crowding-out effects across sectors in the long run.[9]

We confirm these results by using also a different series to proxy tourism services. Instead of relying on export of services from national account (which also include roughly 30% of other exported services), we look at the narrow concept of tourism revenue from Balance of Payments (BOP) data. This data captures more accurately tourism services, but has the drawback of not being seasonally adjusted and only available in nominal terms. To have a seasonally adjusted series reflecting the real volume of services provided, we first deflate the series with the price index for restaurant and hotel services. According to recently released satellite accounts, these expenditure items capture more than half of tourism spending and this price index therefore appears as an adequate deflator. In a second step, we seasonally adjust the series through the TRAMO/SEATS routine. The results are fully consistent with the ones presented above. Differently from the previous model, both cross-adjustment coefficients are not significantly different from 0 and the hypothesis of crowding-out is rejected at an even higher confidence level (χ^2=1.25, p=0.53).[10] Note that in this model the income and price elasticity of exports of goods are broadly similar, but the income and price elasticity for tourism services are estimated at 3.15 and -2.06 respectively. The slightly higher income elasticity suggests that tourism is the more elastic than other exports of services.

What could explain the likely absence of crowding-out effects? We argue, that the structural characteristics of the Croatian tourism sector potentially insulate it from other sectors. These include, among others, a strong seasonal profile and geographical concentration on the coastal region, strong reliance on privately-supplied accommodation and weakly differentiated offer in the traditional sun, sea and beach segment, with overall modest levels of per-capita tourist spending. These factors are also likely to contribute to the relatively low impact of tourism on employment. As discussed in Orsini and Ostojić (2018), Croatia features a relatively low share of workers employed in tourism-related industries, relative to the size of the sector. The low employment-intensity of the sector, implies that a surge in tourism exerts a relatively small increase in employment and hence a limited pull on employment in other industries.

Moreover, one of the main assumptions of Copland's model is perfectly functioning markets – which also implies absence of unemployment. If there is significant slack on the labour market, the expansion of activity in one sector does not have to occur at the expense of other sectors. An additional reason for the lack of crowding-out effects could indeed be the relatively high unemployment rate registered in Croatia throughout most of the period.

Finally, Croatian tourism features a very high leakage rate through imports. As discussed in Orsini (2017), the import elasticity with respect to tourism services is around 0.65. This means that the Croatian tourism sector interacts weakly with other domestic sectors as demand is mainly satisfied by imported goods. This suggests that a potential increase in domestic consumption due to inflow of tourists is unlikely to reduce the availability of goods for export markets.

As a very last step we test for Granger causality to capture potential interactions between the sectors in the short run. The results, not reported in details, show that short-term increase (respectively decrease) in exports of tourism may Granger-cause a short-term decrease (respectively increase) in exports of goods, but not *vice versa*. The Granger-causality tests for the other variables (GDP in the EU and relative prices) suggest that these are also exogenous in the short run. A limited crowding-out effect may therefore occur, but only in the short run. In the long run, Croatia is unlikely to suffer from symptoms of the Beach Disease.

4. Is tourism a source of long-run growth?

The absence of the Beach Disease symptoms does not *per se* imply that tourism is a key or the best driver of economic growth in the long run. Namely, if tourism does not generate strong externalities, it is still likely to bring limited contribution to overall growth, while not directly harming other sectors. In order to verify whether – as argued by Brida et al. (2016) – tourism can have an impact similar to that of exports of goods, we adopt a modified neoclassical growth model. Specifically, we model GDP as a Cobb-Douglas production function with capital, labour and productivity as standard factors, augmented with exports of goods (X) and tourism services (T):

$$(2) Y_t = K_t^{\beta_K} L_t^{\beta_L} X_t^{\beta_X} T_t^{\beta_T} A_t$$

Y is Croatia's GDP, K and L represent capital (proxied by the ratio of gross fixed capital formation to GDP, under a standard assumption of a fixed steady-state relation between investment/GDP and the stock of capital to GDP ratios) and labour (proxied by total employment), respectively, while X and T have the usual meaning. Note that in this framework X and T do not represent demand components, but are supposed to capture the extra benefits to output stemming from economic openness (both in terms of trade of goods and tourism services). To avoid any spurious correlation, stemming from the fact that X and T also enter directly into the GDP aggregate as demand components, we represent the relative weight of exports of goods and tourism services in the economy as intensities – i.e. as ratios of X and T to GDP. The inclusion of exports of goods follows a long-established modelling practice in the literature on export-led growth (Ahumada and Sanguinetti, 1995), and we follow Dubarry (2004) and

Cortés-Jiménez et al. (2009) in further augmenting the production function with tourism services. Finally, A captures residual technological change (from a growth accounting perspective this would be Total Factor Productivity, or TFP).

The model can be linearised through logarithmic transformation and expressed as a VECM to account for the potential endogeneity of all variables. The Matrix β captures again the long-run relations, while matrixes α and Γ_i describe the dynamics in terms of adjustments to the long-run equilibria and responses to short-run shocks:

$$(3)\begin{bmatrix} dY_t \\ dK_t \\ dL_t \\ dX_t \\ dT_t \end{bmatrix} = \alpha\beta' \begin{bmatrix} Y_{t-1} \\ K_{t-1} \\ L_{t-1} \\ X_{t-1} \\ T_{t-1} \end{bmatrix} + \sum_{1=1}^{n} \Gamma_i \begin{bmatrix} dY_{t-i} \\ dK_{t-i} \\ dL_{t-i} \\ dX_{t-i} \\ dT_{t-i} \end{bmatrix} + \begin{bmatrix} \mu_Y \\ \mu_K \\ \mu_L \\ \mu_X \\ \mu_T \end{bmatrix} + \begin{bmatrix} \varepsilon_{Yt} \\ \varepsilon_{Kt} \\ \varepsilon_{Lt} \\ \varepsilon_{Xt} \\ \varepsilon_{Tt} \end{bmatrix}$$

Typically technological change is modelled as an additional stochastic trend, but given the overall weak productivity growth over the whole period and negative TFP dynamics during the crisis, the model performed better without a stochastic trend component.[11]

Table 3: **Johansen cointegration test, intercept but no trend in CE(s), one lag**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.52	96.43	69.82	0.00
At most 1	0.26	41.45	47.86	0.17
At most 2	0.18	19.35	29.80	0.47
At most 3	0.05	4.60	15.49	0.85
At most 4	0.01	0.95	3.84	0.33
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.52	54.99	33.88	0.00
At most 1	0.26	22.09	27.58	0.22
At most 2	0.18	14.75	21.13	0.31
At most 3	0.05	3.65	14.26	0.89
At most 4	0.01	0.95	3.84	0.33

Both tests indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors' calculations

We proceed in a similar fashion as in the previous model and begin by determining the likely size of matrix β. This time our ex-ante expectation is that all variables directly contribute to GDP. If that is the case, differently from the previous model, all variables should be linked through a single long-run equilibrium relation (cointegration vector). The Johansen test (Table 3) confirms that this is indeed the case.[12]

In Table 4, we have normalised the cointegration vector with respect to GDP – so that again the estimated coefficients can be interpreted as long-run elasticities. The largest contributor to growth is labour: an increase in employment of 1 pp yields a more than proportional increase in GDP – i.e. 1.15 (bearing in mind again that in the cointegration vector parameter estimates are expressed with the opposite sign). Capital accumulation also drives growth: 1 pp increase in capital intensity delivers a 0.19 pp increase of GDP in the long run.[13] The lower part of the panel shows the adjustment dynamics. Output adjusts to changes in labour and capital inputs, while the latter are independent, since adjustment coefficients are small and not significantly different from 0. Overall this is consistent with the theoretical expectations of the neoclassical growth model.

Table 4: VECM **– Unconstrained estimates, model (3)**

β	CE1				
Y	1				
K	-0.19				
	(0.03)				
	[-5.66]				
L	-1.15				
	(0.10)				
	[-11.33]				
X	-0.25				
	(0.01)				
	[-27.50]				
T	0.02				
	(0.04)				
	[0.66]				
C	-5.55				
α	**dY**	**dK**	**dL**	**dX**	**dT**
	-0.40	-0.09	0.01	1.49	0.75
	(0.08)	(0.18)	(0.03)	(0.42)	(0.33)
	[-5.01]	[-0.49]	[0.39]	[3.56]	[2.30]

Standard errors in ( ) & t-statistics in [ ]
Estimates of autoregressive components and dummies not reported

Source: Authors' calculations

Similarly to other catching-up economies, exports of goods play a significant role in propelling Croatia's economic growth. The degree of trade openness has a significant impact on GDP. This provides evidence that export-led growth is indeed a valid convergence strategy for Croatia – just as it has been for most other Central and Eastern European economies. An increase in the export intensity by 1 pp delivers a long-run increase in GDP by 0.25 pps. Interestingly, exports do not appear to be (weakly) exogenous in this dynamic system: exports also adjust to changes in capital and labour. The sign, however, is different: exports tend to increase as capital accumulation and employment decrease. This is not surprising and coincides with evidence found in several other European countries: during economic downturns, firms increase their efforts to serve markets abroad to compensate for lower domestic sales (Soares Esteves and Prades, 2016).

Tourism, on the contrary, does not appear to have any significant impact on growth. The point estimate of the long-run elasticity of GDP with respect to tourism intensity is -0.02, suggesting that tourism has an overall marginally negative long-run impact on growth. The coefficient is however not significantly different from 0 and tourism intensity could be excluded as a source of long-run growth altogether. We confirm this by performing a likelihood ratio test where the coefficients corresponding to the long-run impact of tourism on output is constrained to 0 (χ^2=0.28, p=0.59).

The structural characteristics limiting potentially negative crowding-out effects are also likely to constrain tourism's role as a key driver of growth. In the previous sections we have highlighted how structural characteristics of the Croatian tourism sector are likely to limit its crowding-out effect on the tradable sector: high leakage through imports, low employment intensity and limited tourist spending, just to mention the salient ones. The same structural characteristics are likely to severely limit the potentially long-run positive impact of tourism on growth.

The weak impact of tourism on growth is at odds with results found for some other countries and to some extent appears to contradict authorities' generally positive view on tourism. It is important to note that our results should not be interpreted as a claim that tourism does not contribute to growth at all. Tourism-related activities contribute to capital accumulation and employment growth, and subsequently to GDP growth. However, contrary to exports of goods, there is no additional positive spillover to output beyond that of contributing to the accumulation and use of factors of production.

Our core assumption throughout is that only a complete model can provide insights into the impact of tourism on economy and that mis-specification can lead to biased results. For example, results for a bivariate VECM model with only GDP and tourism, pointed to a strong positive relationship between tourism and growth with causality running from tourism to GDP (i.e. a classical example of TLG). Our results therefore do not allow us to confute the TLG hypothesis. We do claim, however, that exports of goods have a more positive impact on overall economic growth than tourism.[14]

Finally, to further check for the robustness of our results, the growth model was also tested with BOP data. Results were broadly similar and again we were able to confirm statistically that tourism intensity can be ruled out as one of the key determinants of economic growth in Croatia in the long run (i.e. tourism intensity was long-run excludable from the cointegration vector).[15]

Concluding remarks

Our empirical findings suggest that while tourism contributes to growth through employment and capital accumulation, differently from exports of goods, it does not generate additional positive spillover effects. At the same time, it is unlikely that tourism exerts any negative crowding-out effects on other tradable sectors – at least not in the long run.

This raises the issue of whether it is possible to improve the contribution of tourism to economic growth, without jeopardising the development of other sectors. Croatian authorities should aim at further improving the quality and diversification of tourism in order to increase its long-run impact on output. As highlighted in the theoretical framework, the higher the share of tradable goods consumed by tourists, the lower the impact on the economy. A more diversified tourist offer could lead to a greater consumption of non-tradable goods and services, such as culture, education or medical services. Likewise, upscaling the offer could lead to higher spending on non-tradable services such as hotels and restaurants, rather than on holiday home rentals and supermarkets.

These strategies could ultimately result in boosting employment in tourism, while negatively affecting other tradable sectors, especially in a moment where labour market shortages seem to resurface. Such constraints could be eased by appropriate labour market policies aimed at increasing the still low labour market participation and possibly facilitating temporary working permits for foreign workers.

Ultimately, if excessive displacements of resources were to be observed, Croatian authorities could re-think some parameters of the tax system. As suggested in Copeland (1991), tax revenue is the best way of extracting benefits from tourism. A well-targeted tax policy aimed at extracting part of rents accruing to the tourism sector could increase the gains from tourism and would also avoid excessive drain of resources form other sectors. The Croatian tax system has already moved in this direction with the recent realignment of the reduced VAT rate on most services in tourism to the standard rate. Increasing the VAT rate in tourism further could create capacity to subsidise growth-enhancing public expenditure in sectors such as education and research and development. This would boost the potential of other tradable sectors, which appear to have a more beneficial impact on Croatia's output potential in the long run.

References

Abbasali, A. Akbari Z. and Ghavamipour M. (2012): International tourism and its role in economies, *Sociālo Zinātņu Vēstnesis*,Vol. 2(1), pp. 5-22.

Ahumada, H. and Sanguinetti, P. (1995),"The export-led growth hypothesis revisited: theory and evidence", Estudios de Economia , Vol. 22 No. 2, pp. 327-355

Balaguer, J. and Cantavella-Jordá, M. (2002): Tourism as a long-run economic growth factor: the Spanish case. *Applied Economics*, No. 34, pp.877-884.

Balassa, B. (1978): Exports and Economic Growth: Further Evidence. *Journal of Development Economics*, Vol. 5, No. 2, pp 181-189.

Bobić, V. (2010): Income and Price Elasticities of Croatian Trade – A Panel Data Approach, *Croatian National Bank Working Papers*, No. 25.

Brida, J.G., Cortes-Jimenez, I. and Pulina M. (2016): Has the tourism-led growth hypothesis been validated? A literature review, *Current Issues in Tourism*, Vol. 19(5), pp. 394–430.

Broz, T. and Dubravčić D. (2011): The Dutch Disease in unwonted places – Why has Croatia been infected while Slovenia remains in good health?, *South-Eastern Europe Journal of Economics*, 1, pp. 47-66.

Copeland, B. R. (1991): Tourism, Welfare and De-industrialization in a Small Open Economy, *Economica*, Vol. 58(232), pp. 515-529.

Corden, J. M. and Neary, J. P. (1982): Booming Sector and De-Industrialisation in a Small Open Economy, *The Economic Journal*, Vol. 92(368), pp. 825-848.

Cortés-Jiménez , I., Pulina, M and Riera i Prunera, C and Artis, M(2009): Tourism and Exports as a means of Growth, *Research Institute of Applied Economics, Working Papers* 2009/10.

Dritsakis, N. (2004): Tourism as a long-run economic growth factor: An empirical investigation for Greece using causality analysis, *Tourism Economics*, Vol. 10(3), 305–316.

Durbarry, R. (2004), "Tourism and Economic Growth: The Case of Mauritius", Tourism Economics, 10: 389-401.

Hajdinjak, S. (2014): Impact of tourism on economic growth in Croatia, *Enlightening Tourism. A Pathmaking Journal*, Vol 4(1), pp. 30-51.

Holzner, M. (2011): Tourism and economic development: The beach disease?, *Tourism Management*, No. 32 pp. 922-33.

IMF (2009): Competitiveness in Central-Europe: What has happened since EU accession? *IMF Working Paper* WP/09/121.

Kasimati, E. (2011): Economic impact of tourism on Greece's economy: Cointegration and causality analysis, *International Research Journal of Finance and Economics*, No. 79, pp. 79–85.

Katircioglu, S. T. (2009): Tourism, trade and growth: The case of Cyprus, *Applied Economics*, 41, pp. 2741–2750.

Lotfi, B. and Karim, M. (2016): Dutch Disease and changes of the productive structure in Moroccan economy. An analysis using VECM, *Advances in Management & Applied Economics*, Vol. 6(4), pp. 25-44.

Lütkepohl, H. (1982), Non-causality due to omitted variables, Journal of Econometrics, no. 19, pp. 267–378.

Massidda, C., and Mattana, P. (2013): A SVECM analysis of the relationship between international tourism arrivals, GDP and trade in Italy. *Journal of Travel Research*, Vol. 52(1), 93–105.

Mervar, A. (2003): Determinante vanjskotrgovinskih tokova RH – Ekonometrijski pristup, Ekonomski institut, Zagreb.

Mieiro, S., Nogueira Ramos, P. and Alves, J. (2012): Gaming tourism boom, foreign currency inflows, and Dutch Disease effects: an empirical model for Macau, *International Journal of Trade, Economics and Finance*, Vol. 3 (6), pp. 421-27.

Nowak, J.-J., Sahli, M., & Corte´s-Jime´nez, I. (2007): Tourism, capital good imports and economic growth: Theory and evidence for Spain, *Tourism Economics*, Vol. 13(4), 515–536.

Orsini, K and Ostojić, V. (2018): Croatia's tourism industry: beyond the sun and sea, European Commission, *DG ECFIN Economic Briefs, 36.*

Orsini, K. (2017), What drives Croatia's high import dependence?, European Commission, *DG ECFIN Economic Briefs*, 29.

Pavlic, I., Svilokos, T. and Tolic, M.S. (2015): Tourism, Real Effective Exchange Rate and Economic Growth: Empirical Evidence for Croatia, *International Journal of Tourism Research*, No. 17, pp. 282–291

Payne, J. E., Mervar, A. (2010): Research note: The tourism-growth nexus in Croatia, *Tourism Economics*, Vol. 16(4), pp. 1089–1094.

Shadab, S. (2018). Tourism and Economic Growth in the United Arab Emirates: A Granger Causality Approach, *Journal of Business and Management*, Vol. 20(4), pp 1-6'

Sheng, L. (2011). Taxing tourism and subsidizing non-tourism: A welfare-enhancing solution to “Dutch disease”? *Tourism Management*, No. 32, pp. 1223–1228.

Soares Esteves, P., Prades, E. (2016): On domestic demand and export performance in the euro area countries: does export concentration matter? ECB Working Paper Series No 1909 / May 2016.

UNTWO (2016): UNWTO Tourism Highlights, 2016 Edition.

[1] In the following we will refer frequently to the tourism industry or sector. Strictly speaking, tourism cannot be considered a sector or industry, but rather a wide-ranging set of activities across different industries – from travel, retail, food and accommodation to public administration. As such, a good and commonly used metric to assess the weight of tourism in in an economy is total expenditure by foreign travellers as a share of the economy's GDP.

[2] Orsini estimates an elasticity of imports with respect to export of services of about 0.65 – meaning that for every euro flowing into the country from tourists' expenditure, 65 cents flow out again through imports.

[3] In the framework of Corden and Neary (1982) the other tradable sector is manufacturing, but depending on the structure of the economy it could be another tradable sector (e.g. agriculture).

[4] In the long run, with perfect capital mobility, results are less clear-cut and crucially depend on the structural parameters of the economy.

[5] A related, but distinct research line is that of Peric and Radic (2016) who investigate the link between tourism and FDI in the tourism sector in Croatia. The authors argue that FDIs cause a surge in tourism and highlight the importance of creating a business environment conducive of FDIs.

[6] Other analyses have used the volume of arrivals or overnights. Such aggregates typically resolve the issue of determining the appropriate deflator, however, in the case of Croatia, there is evidence of a structural break

in the average spending per tourist. This is partly driven by changes in the composition in the country of origin and a growing attractiveness of Croatia for tourists from countries where GDP pro-capita is still below that of countries from which historically large shares of tourism were originating. This implies that the sheer volumes of arrivals/overnights may be a weaker proxy for the impact of tourism on the domestic economy.

[7] A number of statistical tests were performed ahead of running the Johansen test. Firstly we performed unit root tests and ascertained that all statistical series are integrated of order one. This is a necessary condition for defining the system of equation as a potentially co-integrated series. In order to determine the optimal number of lags, we performed a lag restriction test on an unrestricted vector auto regression model. We look at a set of criteria and in case of different outcomes, decided for the lowest number of lags supported by at least two criteria. In this case, the likelihood ratio, final prediction error, Akaike and Hannan-Quinn information criterion all suggested 3 lags in the VAR model. The Johansen test (which applies to a first order difference series) was performed with two lags. Also, as no variable appeared to drift away from others, we selected a model with an unrestricted constant in the cointegraiton equations, but no trend.

[8] Both are highly significant which confirms the validity of modelling the system with two separate long-run equations.

[9] In econometric terms, the lack of adjustment of exports of goods (respectively exports of tourism services) to the long-run equilibrium relation of exports of tourism services (respectively exports of goods) implies that exports of goods (respectively exports of tourism services) are weakly exogenous with respect to the first (respectively second) cointegration relation. This combined with the long-run excludability of export of tourism services in the first cointegration relation and exports of good in the second cointegration relation implies absence of cross-sector spill-overs in the long run.

[10] We test the distribution of residuals in both models, and in both models we could not reject the null hypothesis of residuals being normally distributed.

[11] A possible explanation for the absence of a trend is that over the period considered Croatia went through a long and deep recession – in which TFP decreased sharply. This would explain while over the whole period the productivity gains have been overall muted. Indeed a graphical inspection suggests that a limited drifting of the GDP series with respect to overall employment – which is consistent with overall limited productivity gains.

[12] In this case too, before running the Johansen test of cointegration, we run a lag-exclusion test on the unconstrained Vector Auto Regression (VAR) model. Since the Schwartz and Hannan-Quinn criteria suggest two lags, we opted for just one lag in the Johansen test. The results reported correspond to a model without trend in the cointegration equation.

[13] In interpreting these coefficients, one should recall that in our estimation strategy labour is indeed the stock of employed people, whereas the capital stock was proxied by investment ratio. The values are therefore different from the magnitude of typical confidents found for capital and labour.

[14] We also estimated alternative specifications, including a model with capital, labour and tourism as inputs (but not exports of goods). Results, however, were difficult to interpret, as the elasticities were not very stable and seemed to contradict theoretical predicaments. We interpret this as to confirm Lütkepohl's warning against drawing strong causality conclusions when working with potentially *incomplete* models (Lütkepohl, 1982).

[15] In the model with BOP data, regression residuals did not pass the test for kurtosis, but only the test for skewness, which is – arguably – the most important dimension. Although this might have implications for the LR test critical values, we argue that the result of the test (χ^2=0.60, p=0.43) is sufficiently large to provide a confirmation of the results obtained with the broader export of services aggregate. Note, moreover, that the coefficient in the cointegration equation is indeed not significantly different from 0, just as in the previous model and that this result is robust to non-normal residuals.

EUROPEAN ECONOMY ECONOMIC BRIEFS

European Economy Economic Briefs can be accessed and downloaded free of charge from the following address:
https://ec.europa.eu/info/publications-0/economy-finance-and-euro-publications_en?field_eurovoc_taxonomy_target_id_selective=All&field_core_nal_countries_tid_selective=All&field_core_flex_publication_date[value][year]=All&field_core_tags_tid_i18n=22614.

Titles published before July 2015 can be accessed and downloaded free of charge from:

- http://ec.europa.eu/economy_finance/publications/economic_briefs/index_en.htm
  (ECFIN Economic Briefs)
- http://ec.europa.eu/economy_finance/publications/country_focus/index_en.htm
  (ECFIN Country Focus)

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct Information Centres. You can find the address of the centre nearest you at: http://europa.eu/contact.

On the phone or by e-mail

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696 or
- by electronic mail via: http://europa.eu/contact.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: http://europa.eu.

EU Publications

You can download or order free and priced EU publications from EU Bookshop at: http://publications.europa.eu/bookshop. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see http://europa.eu/contact).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu.

Open data from the EU

The EU Open Data Portal (http://data.europa.eu/euodp/en/data) provides access to datasets from the EU. Data can be downloaded and reused for free, both for commercial and non-commercial purposes.

Publications Office
of the European Union