A further step into the ELGH and TLGH for Spain and Italy

Isabel Cortés-Jiménez and Manuela Pulina

NOTA DI LAVORO 118.2006

SEPTEMBER 2006

NRM – Natural Resources Management

Isabel Cortés-Jiménez, *Regional Quantitative Analysis Research Group (AQR) – IREA, Department of Econometrics, Statistics and Spanish Economy Universitat de Barcelona*
Manuela Pulina, *Centre for North South Economic Research (CRENoS), Department of Economics, D.E.I.R. Università di Sassari*

A further step into the ELGH and TLGH for Spain and Italy

Summary

Nowadays many developing countries focus on economic policies for promoting international tourism and exports expansion as a potential source of economic growth of the country. However, the understanding of the relationship between exports and economic growth is still ongoing. When treating the relationship between tourism and economic growth, considering tourism as a non-traditional export few studies have been published to date. This paper has the objective to assess if exports and tourism have really promoted growth by means of the export-led growth hypothesis (ELGH) and the tourism-led growth hypothesis (TLGH). The cases under analysis are Spain and Italy, two of the most important countries worldwide regarding the expansion of tourism. Cointegration techniques and the multivariate Granger causality test are applied. Results reveal that exports cause economic growth in the long-term for both countries, whilst only for Spain tourism appears as a factor which influences economic growth in the long-run.

Keywords: Economic Growth, Exports, Tourism, Cointegration, Multivariate Granger Causality, Spain, Italy

JEL Classification: L83, C32, O49

Address for correspondence:

Isabel Cortés_Jiménez
Department of Econometrics
Statistics and Spanish Economy
Universitat de Barcelona
Avda Diagonal, 690 Torre 4
08034 Barcelona
Spain
Phone: +34 934024319
Fax: +34 934021821
E-mail: icortes@ub.edu

I. INTRODUCTION

The export-led growth hypothesis (ELGH) postulates that the economic growth of countries can be generated not only by increasing the amount of labour and capital within the economy, but also by expanding exports. Actually, exports are generally supposed to contribute positively to economic growth through different means: facilitating the exploitation of economies of scale (Helpman and Krugman, 1985), relieving the foreign exchange constraint (McKinnon, 1964), enhancing efficiency through increased competition (Krueger, 1980), and promoting the diffusion of technical knowledge (Grossmand and Helpman, 1991). The ELGH has been widely analysed in the literature[1] and although there is a widely held belief that exports promote economic growth at a theoretical level, empirically evidence is rather mixed[2]. Due to this fact, even today there is a keen interest in these issues especially for developing countries. Recent empirical articles (Panas and Vamvoukas (2002) for Greece, Abual-Foul (2004) for Jordan, Al Mamun and Nath (2005) for Bangladesh and Awokuse (2005a,b) for Japan and Korea, respectively) analyse the causality between exports and economic growth in a bivariate context. Only a few studies employ a multivariate framework; amongst others Islam (1998) and Khalafalla and Webb (2001)[3].

Directly derived from the ELGH, the tourism-led growth hypothesis (TLGH) has recently appeared in the literature. Balaguer and Cantavella-Jordà (2002) were the first authors to mention this concept. Since then increasing attention has been paid to this issue. Taking into account that international tourism can be considered firstly as a non-

[1] Giles and Williams (2000) provide a comprehensive survey over seventy time series studies.

[2] For instance, Marin (1992) supports the hypothesis of export-led economic growth in developed countries such as United States, Japan, United Kingdom and Germany whilst Shan and Sun (1998) demonstrate a bidirectional causality between exports and economic growth in China.

[3] These authors use GDP, exports and imports in a cointegration framework and investigate long-run and short-run causality relationships among these variables.

traditional export since it implies a source of receipts[4] and, secondly, international tourism has experienced such a huge increase that nowadays it is being considered as a potential strategic factor to development and economic growth, it seems straightforward to understand the derivation of the TLGH from the ELGH. To date, only empirical papers can be found and there is a clear lack of theoretical literature about TLGH. In this context, several researchers are interested in demonstrating that tourism can be considered as a main factor of economic growth for developing countries. The current papers on this issue are Balaguer and Cantavella-Jordà (2002) for Spain, Dritsakis (2004) for Greece, Gunduz and Hatemi-J (2005) for Turkey, Oh (2005) for Korea and Kim *et al.* (2006) for Taiwan. Analogously to ELGH, these authors analyse the possible causal relationship between tourism and economic growth in a bivariate context; however, not all of them find evidence of the long-run causality from tourism to economic growth. Therefore, whether tourism growth actually causes the economic growth or, alternatively, economic expansion strongly contribute to tourism growth is a question not well answered at this moment in time.

Amongst the empirical studies on the ELGH and the TLGH hypotheses, we have found an interesting paper by Durbarry (2004). This author mixes both the hypotheses since he uses a production function where the economic growth is explained by physical capital, human capital and exports. The latter variable is included into the model in a disaggregated manner and international tourism is one of the items. This empirical work focuses on the economy of Mauritius.

[4] International tourism implies consumption *in situ*, the consumers are who must move rather than the product as happens with exports.

The present paper attempts to go a step further in the ELGH and TLGH. The main objectives of this work are to assess whether the ELGH and the TLGH employed in a multivariate context are valid for two developed countries, namely Spain and Italy.

The main contributions of the present research can be found in the following: the estimated model, the applied methodology and the variables included in the model. Data on exports and GDP, and on international tourism receipts and GDP are employed aimed to analyse the causal interrelationship amongst the variables of interest. Based on Durbarry (2004), a standard production function is estimated including exports as a factor to economic growth when evaluating the ELGH, and international tourism receipts as a further possible factor which influences economic growth when studying the TLGH. In addition to this, and expanding Durbarry's (2004) study, the present paper also investigates the short-run and long-run relationships and Granger causality using a multivariate Granger test.

Regarding previous research on this field for the Italian case, it is worth mentioning that Federici and Marconi (2002) paper is the unique research found. In their work, the ELGH for the Italian economy (1960-98) is tested through a Vector Autoregression (VAR) model with four macroeconomic variables: an index of the GDP of the rest of the world; the Italian real exchange rate; Italian real exports; and the Italian real GDP providing empirical support for the hypothesis. As far ar TLGH is concerned, no articles have been found.

With respect to Spain, the papers of Balaguer and Cantavella-Jordà (2002, 2004) support the TLGH and the ELGH, respectively. However, these two works test if international tourism receipts (1975-1997, quarterly data) and exports (1961-2000, annual data) Granger causes GDP, including an exchange rate and the applied test is a

simple Granger test where the error correction term is not considered. According to Granger (1988), the conventional causality tests are valid only if the original time series do not cointegrate. If they do, an error correction model should be used by including the relevant error correction term in the model to check for causality. Therefore, the paper of Balaguer and Cantavella-Jordá while a starting point for later research on TLGH, however, we cannot draw conclusive results from this empirical work. In the present study we avoid this econometric problem by applying appropriate tests in each case.

In this study, firstly, three hypotheses are examined referring the ELGH in Spain and Italy, separately: (a) the ELGH; (b) the economic-driven exports growth hypothesis; (c) the two-way causal hypothesis which combines (a) and (b), where the causality between exports and economic growth may run in one or both directions. Secondly, regarding TLGH other three hypotheses are evaluated for Spain and Italy, separately: (d) the TLGH; (e) the economic-driven tourism growth hypothesis; (f) the two-way causal hypothesis which combines (d) and (e), where the causality between tourism and economic growth may run in one or both directions.

Recognition of the existence of a causal relationship between international tourism/exports and economic growth will have important implications for the development of different tourism marketing/external trade and policy decisions. If a unidirectional causality from tourism growth to economic expansion is found, then tourism-led economic growth is practical. If results show the opposite causality, then the economic development may be necessary for the expansion of the tourism industry/exports sector. Next, if the causative process is bidirectional, and tourism growth/exports expansion and economic growth have a reciprocal causal relationship, then a push in both areas would be beneficial. Finally, if there is no causality relation

between tourism growth/exports increase and economic development, then strategies oriented to promote tourism sector/external sector may not be as effective as expected.

This study seeks to go a step further both in the export-led growth hypothesis and in the tourism-led growth hypothesis by testing cointegration, constructing a multivariate VAR model based on a standard production function of economic growth and, lastly, attempting to capture the short-run and long-run effects of the different variables for the Spanish and the Italian economies.

The paper is organised as follows. The previous section gives a brief review of the most important issues on the ELGH and the TLGH, and the objectives of the present research are highlighted. The next section describes the Italian and the Spanish economies and their evolution to provide a general overview on these cases studies. Section 3 describes the data, methodology and results from this empirical analysis. Finally, Section 4 presents the concluding discussion and further comments.

II. SPAIN AND ITALY: A GENERAL OVERVIEW

There is no doubting the importance of tourism for Spain and Italy during the last several decades. Nowadays Spain and Italy are the most important countries in the Mediterranean area regarding international tourism. What is more, in 2005 they ranked second and fourth in the classification of the top ten tourism destinations worldwide as regard to international tourism receipts (UNWTO). The aim of this section is to provide a general overview of the characteristics of the Spanish and the Italian economies. Table 1 provides relevant economic data for these two countries from 1960 to date.

Spain is a widely referenced success case regarding the expansion of tourism and how to take advantage of this activity to develop economic performance. It has been argued that the source of foreign currency receipts generated by tourism during the sixties and the seventies financed the imports of produced goods which were necessary to carry out the industrialisation process (Sinclair and Bote Gómez, 1996). Thus, the international tourism expansion in Spain played a relevant role for becoming a developed country. From Table 1, it can be observed how Spain passes from a developing economy to a developed one. It is worth remarking that exports and international tourism have been significantly more and more important in each period.

Nowadays Italy is a developed country with an important exports and tourism sector as shown in Table 1. Comparing briefly Spain and Italy, it is worth mentioning that Italy has had a bigger exports sector whilst Spain has experienced the highest numbers regarding international tourism. As regards 2003 data, Spain had 27.9% of GDP corresponding to exports of goods and services whereas for Italy it was of 25.4%. When dealing with tourism data, we find that in 2004 Spain had 36376 million euros of international tourism receipts whereas Italy had 28665. It seems clear that Spain continues growing whilst Italy seems to depict a stable pattern.

Thus they offer two potentially valuable cases of study. Due to their economic characteristics and evolution during the last decades, Spain and Italy are suitable countries to assess the ELGH and TLGH.

III. MODEL, METHODOLOGY AND RESULTS

As explained previously, following Ukpolo (1994), Ghatak *et al.* (1995) and Durbarry (2004), we adopt a production function framework that is compatible with the 'new' growth theory, where one has the following functions: $Y = f(X, K, H)$ and $Y = f(T, K, H)$. The data are annual Spanish and Italian series on real per capita Gross Domestic Product (Y), exports (X), international tourism receipts (T), physical capital (K), human capital (H). For Spain the sample period is available from 1964 to 2000; for Italy the sample period is from 1954 to 2000. Data definitions and sources are listed in the appendix.

Expressing the previous mentioned functions in a linear logarithmic regression form, the multivariate relationships are investigated:

$$LY_t = \psi_0 + \psi_1 LX_t + \psi_2 LK_t + \psi_3 LH_t + u_t \quad (1)$$

$$LY_t = \varpi_0 + \varpi_1 LT_t + \varpi_2 LK_t + \varpi_3 LH_t + v_t \quad (2)$$

The ELGH will be assessed through expression (1) and the TLGH wil be investigated through expression (2).

The methodology employed to investigate the relationship amongst on the one hand, growth, exports, physical capital and human capital and, on the other hand, growth, international tourism, physical capital and human capital, consists of three steps. The first step is to test the order of integration of the natural logarithm of all the variables[5]. Table 2 gives the results of the augmented Dickey-Fuller (ADF) and standard Phillips-Perron (PP) test statistics. These tests are used to detect the presence of a unit root for the individual time series and their first differences. Each of the series appears to be

[5] Plots of the all series expressed in natural logarithm are also shown in Figures 1 and 2.

integrated of order I(1) in the level form but I(0) in first differences (Engle and Granger, 1987). The PP test is consistent with ADF test.

Given the unit root results, the second step is to use the VAR approach that Johansen (1988) and Johansen and Juselius (1990) employed to investigate the cointegrating properties of a system. The joint *F*-test and the AIC, SC and HQ Information Criteria[6] are used to select the number of lags required in each case to assure white-noise residuals; thus, the chosen lag length is accordingly either one or two (Oh and Lee, 2004). The cointegration test results are presented in Table 3. Models 1 and 3 are VARs employing growth, exports, physical capital and human capital for Spain and Italy, respectively. Models 2 and 4 are VARs employing growth, international tourism receipts, physical capital and human capital for Spain and Italy, respectively. A single significant cointegrating vector is identified using the maximum eigenvalue and trace statistic in all cases[7]. Hence, we conclude that all variables are cointegrated, and causally related in each model. It is worthwhile noticing that in the cointegrating vector (Table 3, Model 1) a long-run negative relationship is detected between exports and economic growth. However, the coefficient for *LX* is not statistically significant; the same conclusion can be reached for *LH*. In Model 2, *LK* negatively effects economic growth, nevertheless, the coefficient turns out to be statistically insignificant. A mix result is reached for *LH*, though showing a statistically significant coefficient at the 5% level, it presents a negative sign. For the Italian case (see Models 3 and 4), *LH* negatively influences economic growth, however, in both the cases, the coefficient is not statistically significant[8].

[6] Akaike, Schwartz and Hannan-Quinn Information criteria, respectively.
[7] In Model 2 only the trace statistics detects a cointegrating vector (see Table 3).
[8] It is worthwhile pointing out that in the majority of empirical studies that employ the VEC framework, authors do not report the outcome from the long run analysis obtained using the cointegrating vector.

The third step is to carry out a multivariate Granger causality test (Sims *et al.,* 1990; Khalafalla and Webb, 2001) augmented with the error-correction mechanism (*ECT*) as derived from the cointegration relationship, as given in equations (3)-(6).

$$\Delta Y_t = \alpha_1 + \sum_{i=1}^{p} \beta_i \Delta Y_{t-i} + \sum_{i=1}^{p} \gamma_i \Delta X_{t-i} + \sum_{i=1}^{p} \delta_i \Delta Z_{t-i} + \sum_{i=1}^{p} \theta_i \Delta V_{t-i} + \eta_1 ECT_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta X_t = \alpha_2 + \sum_{i=1}^{p} \sigma_i \Delta Y_{t-i} + \sum_{i=1}^{p} \phi_i \Delta X_{t-i} + \sum_{i=1}^{p} \rho_i \Delta Z_{t-i} + \sum_{i=1}^{p} \lambda_i \Delta V_{t-i} + \eta_2 ECT_{t-1} + \mu_t \quad (4)$$

$$\Delta Z_t = \alpha_3 + \sum_{i=1}^{p} \omega_i \Delta Y_{t-i} + \sum_{i=1}^{p} \zeta_i \Delta X_{t-i} + \sum_{i=1}^{p} \chi_i \Delta Z_{t-i} + \sum_{i=1}^{p} \xi_i \Delta V_{t-i} + \eta_3 ECT_{t-1} + \nu_t \quad (5)$$

$$\Delta V_t = \alpha_4 + \sum_{i=1}^{p} \vartheta_i \Delta Y_{t-i} + \sum_{i=1}^{p} \upsilon_i \Delta X_{t-i} + \sum_{i=1}^{p} \kappa_i \Delta Z_{t-i} + \sum_{i=1}^{p} \pi_i \Delta V_{t-i} + \eta_4 ECT_{t-1} + \tau_t \quad (6)$$

The *t*-statistics on *ECT* indicates the existence of long-run causality, whereas the significance of *F*-statistics indicates the presence of short-run causality. These tests are provided in Table 4. First, as regards the long-run, in equation (2), if η_1 is statistically different from zero, the null hypothesis can be rejected, and one concludes that the variable *Y* Granger causes the variable *X*. In equation (3) if η_2 is statistically different from zero, one concludes that the independent variable *X* Granger causes *Y*. In equation (4), if η_3 is statistically different from zero, one infers the variable *Z* Granger causes the variable *Y*. Finally, in equation (5), if η_4 is statistically different from zero, one infers the variable *V* Granger causes the variable *Y*. Second, referring to the short-run, in equation 2, for example, if γ_i is jointly statistically different from zero, and the null hypothesis cannot be accepted, one finds that *X* Granger causes *Y* (see Khalafalla and Webb, 2001). Results are provided in Tables 4 and 5 for Spain and Italy, respectively.

From the first equation the *t*-statistics, shown in Table 4 for Model 1, indicates that the coefficient of the cointegrating vector is statistically significant at the 1% level, thus a long-run causal relationship exists running from GDP (*LY*) to exports (*LX*). The results from the second equation also show a bidirectional relationship since *LX* Granger causes *LY* in the long-run. Additionally, a weak short-run relationship is found running from *LY* to *LX*. A further result is the existence of a long-run Granger causality running from *LK* to *LY*. In the last equation, once again there is evidence of a long-run Granger causality running from *LH* to *LY* as well as a short-run Granger causality running from *LY*, *LX* and *LK* to *LH*. For Model 2 there is a bidirectional long-run Granger causality between *LY* and *LT* as well as a short-run relationship from *LT* to *LY*. Furthermore, in the long-term *LK* Granger causes *LY*. Finally, *LY* Granger causes *LH* in the short-run as shown in the last equation.

For the Italian case, the results are shown in Table 5. Model 3 shows a bidirectional long-run Granger causality relationship between *LY* and *LX*. Regarding short-run relationships, *LX* and *LH* Granger cause *LY*, respectively (first equation). In the third equation, a long-run relationship exists running from *LK* to *LY* and in the short-term there is also a strong causal relationship from *LY*, *LX*, *LH* to *LK*. Model 4 shows a unidirectional long-run causal relationship from *LY* to *LT*; in the short-run *LH* Granger causes *LY*. From the third equation, one infers that *LK* Granger causes *LY* in the long-run. Lastly, *LH* Granger causes *LY* in the long-run.

IV. DISCUSSIONS AND CONCLUSIONS

The main objective of this study is to test if the export-led growth and the tourism-led growth hypotheses hold for Spain and Italy, respectively. The existence of these relationships have been analysed using a cointegration framework. Inspired by Durbarry (2004) paper, instead of analysing only the relationship between exports and GDP and international tourism receipts and GDP, one uses two separate production functions of economic growth where physical capital, human capital are also included. The results of the tests for cointegration indicate that: both exports (*LX*) and tourist receipts (*LT*), employed in two separate systems, and economic growth (*LY*), physical capital (*LK*) and human capital (*LH*) are cointegrated, implying that a long-run relationship exists amongst these variables in each of the model.

The multivariate Granger causality results from the VEC (Vector Error Correction) analysis highlight key findings. The evidence suggests that the ELGH hypothesis is confirmed both for Spain and Italy. Specifically, one finds a long-run bidirectional causality from economic growth to exports for both of the countries. In the short-run, economic growth Granger causes exports in the Spanish case, whereas exports Granger cause economic growth in the Italian case.

On the one hand, in the long-run the TLGH is confirmed for Spain and one concludes that a bidirectional relationship exists between economic growth and international tourism expansion; moreover, in the short-run evidence appears that tourist activity Granger causes economic growth. On the other hand, for the Italian case, the finding is that the economic development may be necessary for the expansion of tourism activity; here the TLGH is not confirmed. No short-run relationships are found in this case.

The multivariate Granger causality gives more insight on the relationships amongst all the other variables included in each of the production functions. As far as Spain is concerned, all factors appear as a cause of economic growth in the long-run; hence, tourism is not the essential sector but a complementary sector to take into account in the strategic and promotion policies adopted by governments and policy makers.

In the Italian case, taking into consideration the ELGH hypothesis as presented in Model 3, exports and physical capital appear to be the sole causal factors for the economic growth. In Model 4, however, GDP causes tourism; and, physical capital and human capital cause economic growth in the long-run. Hence, overall, there is empirical evidence that suggests that policies to promote trade expansion, physical and human capital will increase growth.

As Oh (2005) remarks it is commonly believed that tourism has contributed positively to economic growth as exports have strongly triggered economic expansion. Following most of the ELGH papers, here we find evidence that supports the export-led growth hypothesis for both Spain and Italy. Nevertheless, TLGH is only confirmed for Spain. One must take into account that the present research employs a production function where physical and human capital are also included in a multivariate framework, instead of using only exports and GDP and international tourism receipts and GDP. Therefore, this paper can be regarded as an expansion of the existing empirical works, though mix results have been achieved in the Italian case.

REFERENCES

Abual-Foul, B. (2004) Testing the export-led growth hypothesis: evidence from Jordan, *Applied Economics Letters*, **11**, 393-396.

Al Mamun, K. A. and Nath, H. K. (2005) Export-led growth in Bangladesh: a time series analysis, *Applied Economics Letters*, **12**, 361-364.

Awokuse, T. O. (2005a) Export-led growth and the Japanese economy: evidence from VAR and directed acyclic graphs, *Applied Economics Letters*, **12**, 849–858

Awokuse, T. O. (2005b) Exports, economic growth and causality in Korea, *Applied Economics Letters*, **12**, 693–696.

Balaguer, J. and Cantavella-Jordá, M. (2002) Tourism as a long-run economic growth factor: the Spanish case, *Applied Economics*, **34**, 877-884.

Balaguer, J. and Cantavella-Jordá, M. (2004) Structural change in exports and economic growth: cointegration and causality analysis for Spain (1961–2000), *Applied Economics*, **36**, 473-477.

Dickey, D.A. and Fuller, W.A. (1981) Likelihood Ratio Statistics for autoregressive Time Series with a Unit Root, *Econometrica,* **49** (4), 1061-1072.

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

Durbarry, R. (2004) Tourism and economic growth: the case of Mauritius, *Tourism Economics*, **10** (4), 389-401.

Engle, R. F. and Granger, C.W.J. (1987) Cointegration and error correction: Representation, estimation and testing, *Econometrica*, **55**, 251-276.

Engle, R.E. and Yoo, B.S. (1989) A Survey of Cointegration, University of California, San Diego, CA, mimco.

Federici, D. and Marconi, D. (2002) On exports and economic growth: the case of Italy, *Journal of International Trade and Economic Development*, **11**(3), 323-340.

Ghatak, S., Milner, C. and Utkulu, U. (1997) Exports, export composition and growth: cointegration and causality evidence for Malaysia, *Applied Economics*, **29**, 213–223.

Giles, J.A. and Williams, C.L. (2000) Export-led growth: A survey of the empirical literature and some non-causality results. Part 1, *Journal of International Trade and Economic Development*, **9**, 261-337.

Grossman, G. M. and Helpman, E. (1991) *Innovation and growth in the global economy*, MIT Press, Cambridge.

Gunduz, L. and Hatemi-J, A. (2005) Is the tourism-led growth hypothesis valid for Turkey?, *Applied Economics Letters*, **12**, 499-504.

Helpman, E. and Krugman, P. (1985) *Innovation and growth in the global economy*, MIT Press, Cambridge.

Islam, M.N. (1998) Export expansion and economic growth: testing for cointegration and causality, *Applied Economics,* **30**, 415-425.

Johansen, S. (1988) Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control,* **12**, 231-254.

Johansen, S. (1995) *Likelihood Based Inference in Cointegrated Vector Autoregressive Models*, Oxford, Oxford University Press.

Johansen,S. and Juselius, K. (1990) Maximum Likelihood Estimation and Inference on Cointegration - With Applications to the Demand for Money, *Oxford Bulletin of Economics and Statistics,* **52**(2), 169-210.

Kim, H. J., Chen, M. and Jan, S. (2006) Tourism expansion and economic development: The case of Taiwan, *Tourism Management*, Forthcoming.

Khalafalla, K. Y and Webb, A.J. (2001) Export-led growth and structural change: evidence from Malaysia*, Applied Economics,* **33**, 1703-1715.

Krueger, A. (1980) Trade policy as an input to development, *American Economic Review*, **70**, 188-292.

Marin, D. (1992) Is the export-led hypothesis valid for industrialized countries?, *Review of Economics and Statistics*, **74**, 678–688.

McKinnon, R. (1964) Foreign exchange constraint in economic development and efficient aid allocation, *Economic Journal*, **74**, 388-409.

Oh, C. (2005) The contribution of tourism development to economic growth in the Korean economy, *Tourism Management*, **26** (1), 39–44.

Oh, W. and Lee, K. (2004) Energy consumption and economic growth in Korea: testing the causality relation, *Journal of Policy Modelling*, **26** (1), 973-981.

Osterwald-Lenum, M. (1992) A Note with Quintiles of the Asymptotic Distribution of the Maximum Likelihood Cointegration Rank Test Statistics Four Cases, *Oxford Bolletin of Economics and Statistics,* **54**, 461-472.

Panas, E. and Vamvoukas, G. (2002) Further evidence on the Export-Led Growth Hypothesis*, Applied Economics Letters,* **9**, 731-735.

Phillips, P.C.B. and Perron, P. (1988) Testing for a Unit Root in Time Series Regression, *Biometrika,* **75**, 335-346.

Shan, J., and Sun F. (1998) On the export-led growth hypothesis: The economic evidence from China, *Applied Economics*, **30**, 1055–1065.

Sims, C. A., Stock, J. H. and Watson, M. W. (1990) Inference in linear time series models with some unit roots, *Econometrica*, **58**, 113-144.

Sinclair, M.T. (1998) Tourism and Economic Development: A Survey, *The Journal of Development Studies*, **34** (5), 1-51.

Sinclair, M.T. and Bote Gómez, V. (1996) Tourism, the Spanish Economy and the Balance of Payments, in M. Barke, M. Newton and J. Towner (eds.) *Tourism in Spain: Critical Perspectives*, Wallingford: C.A.B. International.

Thornton, J. (1997) Exports and economic growth: Evidence from 19th Century Europe, *Economics Letters*, **55**, 235-240.

Ukpolo, V. (1994) Export composition and growth of selected low-income African countries: evidence from time series data, *Applied Economics*, **16**, 445–449.

UNWTO, (2006) Facts and Figures: Tourism Indicators. http://world-tourism.org

Figure 1 Natural Logarithm of the Economic Series (Spain: 1964 - 2000)

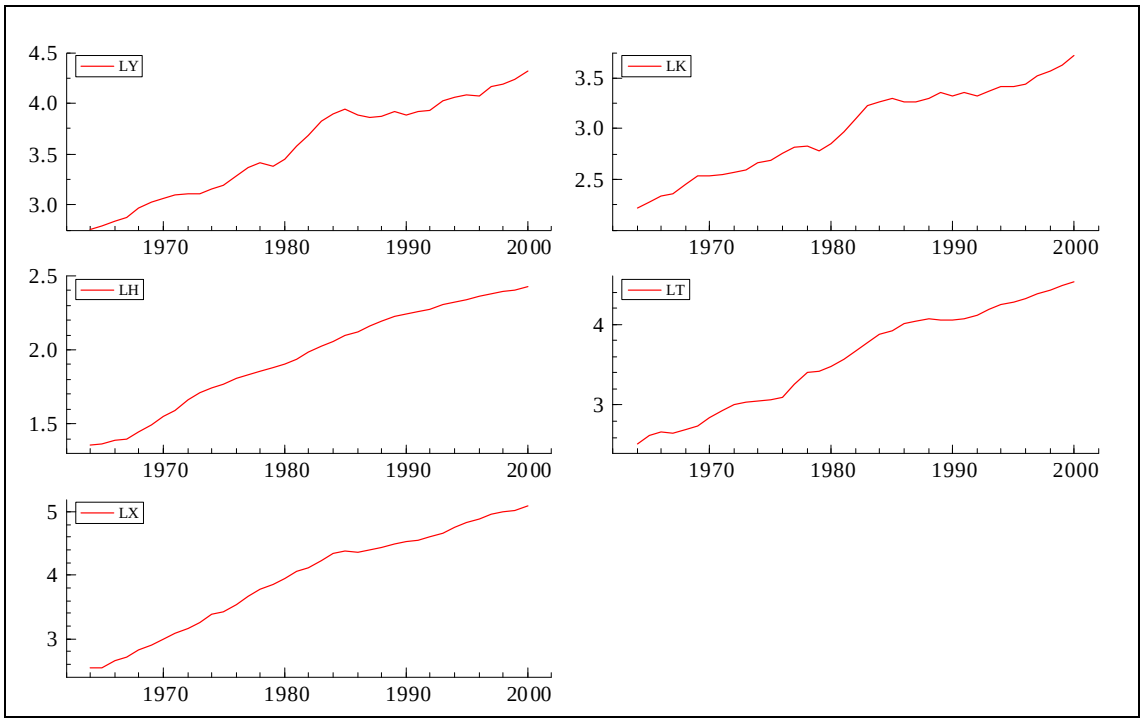

Figure 2 Natural Logarithm of the Economic Series (Italy: 1954 - 2000)

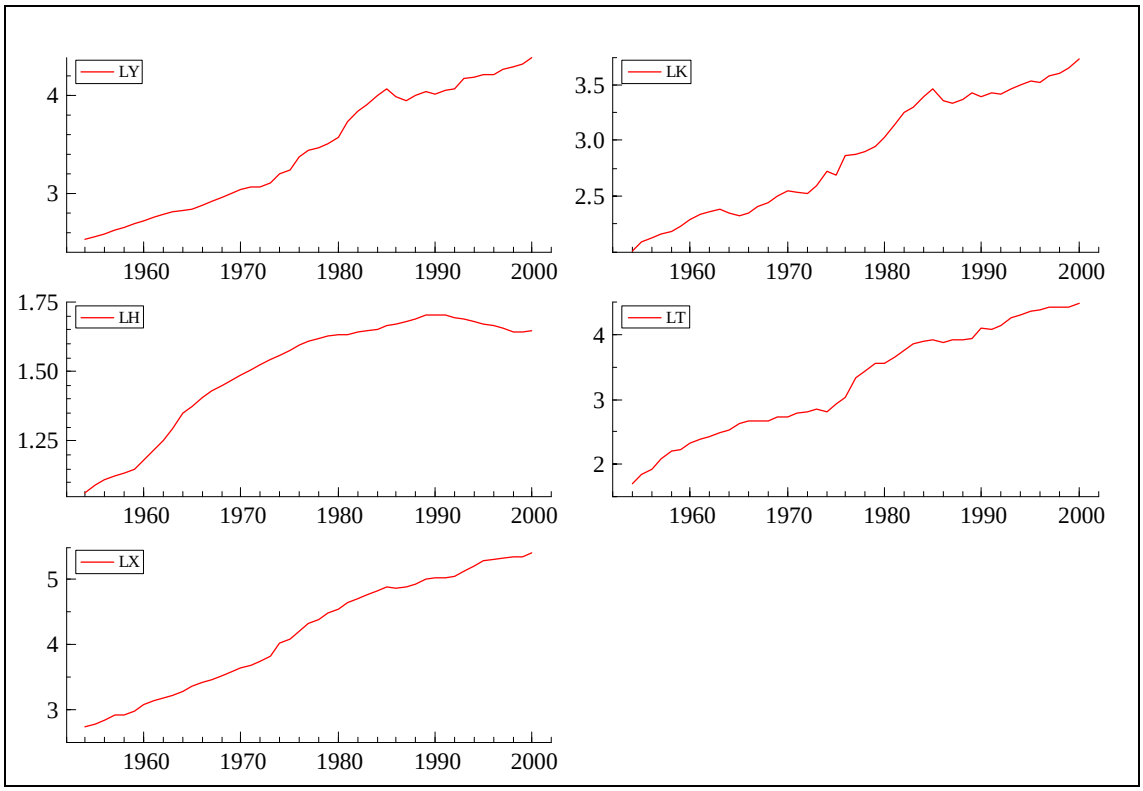

Table 1. Economic features of Spain and Italy

	1960	1970	1980	1990	2000
SPAIN					
Real GDP per capita	1107	2729	6446	12525	19037
GDP growth (annual %)	11.8 (*)	4.2	2.2	3.8	4.2
Labor force	11.7	12.7	13.9	15.7	17.8
Investment Share of Real GDP	22.6	30.2	25.8	27.4	25.5
Exports of goods and services (% of GDP)	8.4	12.6	14.8	16.3	30.1
International Tourism Receipts	107	707	3003	11390	33750
ITALY					
Real GDP per capita	1620	3417	8413	16817	22876
GDP growth (annual %)	8.21(*)	6.10	3.48	1.97	3.03
Labor force	20.8	21.1	22.6	24.4	25.5
Investment Share of Real GDP	37.2	32.2	28.9	23.6	21.7
Exports of goods and services (% of GDP)	12.7	16.1	21.6	19.7	28.3
International Tourism Receipts	207	529	3633	12216	29919

Notes: (1) * this number corresponds to 1961; (2) labor force data is measured in million people; (3) the source for international tourism receipts for Spain is INE and for Italy is ISTAT, these data are measured in million euros; (4) the source of the rest of the data is World Development Indicators (2004).

Table 2. Unit root tests

Variable	ADF	Lags	PP	lags
Spain				
LY	-0.51	0	-1.49	0
ΔLY	-6.47 ***	0	-3.50**	7
LK	-2.45	1	-1.83	0
ΔLK	-4.01**	0	-3.77**	5
LH	-0.73	1	0.21	2
ΔLH	-4.20**	4	-4.72***	9
LX	-0.39	0	-0.53	2
ΔLX	-5.69***	0	-5.68***	2
LT	-1.89	1	-1.07	0
ΔLT	-3.94 **	1	-3.70**	5
Italy				
LY	-2.38	1	-1.75	2
ΔLY	-3.80**	0	-4.81***	2
LK	-1.66	0	-1.81	2
ΔLK	-6.15***	0	-6.15***	1
LH	-0.73	1	0.18	4
ΔLH	-6.53***	4	-3.17*	3
LX	-0.15	0	-0.63	4
ΔLX	-4.65***	0	-5.20***	2
LT	-2.21	2	-2.15	2
ΔLT	-4.78***	0	-5.47***	0

Notes: (1) MacKinnon critical values for rejection of hypothesis of a unit root. (2) *** and ** indicate significance at the 1% and 5% levels, respectively. (3) Δ denotes the first-difference operator. (4) Number of lags set to the first statistically significant lag, testing downwards; number of lags in the ADF test is set upon AIC criterion and PP test upon Newey-West bandwidth. (5) Constant and trend are included in all cases.

Table 3. Tests for cointegration using the Johansen procedure

SPAIN. Sample period: 1964-2000				
Model 1: Y = f (X, K, H)				
Hypothesis	r=0	r≤1	r≤2	r≤3
λ max test	38.28***	14.10	12.34	9.97
Trace test	74.70***	36.42	22.32	9.97
Cointegration equation:				
LY = -0.67LX + 3.18LK - 0.15LH – 4.02				
(-0.82) (3.23) (-0.09) (-3.82)				
Model 2: Y = f (T, K, H)				
Hypothesis	r=0	r≤1	r≤2	r≤3
λ max test	28.94	20.10	16.74	4.90
Trace test	70.70***	41.76	21.65	4.90
Cointegration equation:				
LY = 1.07LT - 0.07LK - 0.39LH - 0.004trend				
(6.75) (-0.38) (-2.21) (-0.86)				
ITALY. Sample period 1954-2000				
Model 3: Y = f (X, K, H)				
Hypothesis	r=0	r≤1	r≤2	r≤3
λ max test	34.40***	21.73	10.23	6.92
Trace test	73.27***	38.88	17.15	6.92
Cointegration equation:				
LY = 0.50LX + 0.34LK – 0.17LH + 0.74				
(4.09) (2.14) (-1.22) (6.02)				
Model 4: Y = f (T, K, H)				
Hypothesis	r=0	r≤1	r≤2	r≤3
λ max test	28.84**	14.73	11.36	5.13
Trace test	60.08**	31.24	16.50	5.13
Cointegration equation:				
LY = 0.08LT + 0.98LK – 0.01LH + 0.46				
(1.68) (15.22) (-0.25) (6.08)				

Notes: (1) Numbers in parenthesis are t-test, (2) **, *** denote that a test statistics at the 5% and 1 % levels of significance, respectively.

Table 4. Spain: Granger causality results based on vector error-correction model

Model 1. Y = f (X, K, H)					
			F-test		**t-test**
	ΔLY	**ΔLX**	**ΔLK**	**ΔLH**	**ECT_{t-1}**
ΔLY	-	0.26	0.13	1.40	2.73***
ΔLX	2.86*	-	0.56	0.14	5.46***
ΔLK	0.86	0.70	-	0.29	2.55***
ΔLH	7.85***	8.58***	4.82***	-	4.81***
Model 2. Y = f (T, K, H)					
			F-test		**t-test**
	ΔLY	**ΔLT**	**ΔLK**	**ΔLH**	**CIt-1**
ΔLY	**-**	2.92*	0.26	0.11	-2.34**
ΔLT	0.50	**-**	1.25	0.09	2.33**
ΔLK	1.66	2.22	**-**	0.36	-2.48***
ΔLH	2.51*	0.89	2.35	**-**	-1.25

Note: (1) ***, ** and * indicate that a test statistics is significant at the 1%, 5% and 10% levels of significance, respectively.

Table 5. Italy: Granger causality results based on vector error-correction model

Model 3. Y = f (X, K, H)					
			F-test		**t-test**
	ΔLY	**ΔLX**	**ΔLK**	**ΔLH**	**CI_{t-1}**
ΔLY	-	11.49 ***	1.00	5.63***	-6.63***
ΔLX	2.24	-	0.32	0.07	-4.59***
ΔLK	4.73***	7.72***	-	4.94***	-5.34***
ΔLH	0.15	0.05	0.35	-	-0.73
Model 4. Y = f (T, K, H)					
			F-test		**t-test**
	ΔLY	**ΔLT**	**ΔLK**	**ΔLH**	**ECT_{t-1}**
ΔLY	-	0.84	2.09	4.31***	-2.75**
ΔLT	2.51	-	0.01	0.03	-0.78
ΔLK	1.38	2.66	-	2.16	-1.67**
ΔLH	0.15	1.65	1.07	-	-3.79**

Note: (1) ***, ** and * indicate that a test statistics is significant at the 1%, 5% and 10% levels of significance, respectively.

APPENDIX

Data description and sources

Common sources for Spain and Italy (million euros)

- Real Gross Domestic Product per capita (*Y*) was taken from the Penn World Table 6.1.
- Investment share of *Y* and it was taken from the Penn World Table 6.1. The variable physical capital was built calculating investment data.
- Population data from the Penn World Table 6.1.

For Spain:

- Active population with secondary level of education, this serie was taken from IVIE (Instituto Valenciano de Investigaciones Económicas). The human capital indicator was built dividing the mentioned serie by total population.
- Total exports and international tourism receipts data from INE (Instituto Nacional de Estadística)

For Italy:

- Population with secondary level of education. This serie was taken from the ISTAT (Istituto Nazionale di Statistica). The human capital indicator is the mentioned data divided by total population.
- Total exports and international tourism receipts from ISTAT.

ACKNOWLEDGEMENTS

The authors thank Marco Vannini and Robert Young for their helpful comments and the ISTAT office of Cagliari for their technical support. Isabel Cortés-Jiménez acknowledges the financial support of the Department of Universities, the Research and Information Society from the Government of Catalonia and the European Social Funding. Manuela Pulina acknowledges the financial support of the Department of Economics (D.E.I.R.), Sassari University, within the PRIN Project – MIUR 2004 "Strumenti Economici per il Turismo Sostenibile".

NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

http://www.feem.it/Feem/Pub/Publications/WPapers/default.html
http://www.ssrn.com/link/feem.html
http://www.repec.org
http://agecon.lib.umn.edu

NOTE DI LAVORO PUBLISHED IN 2006

SIEV	1.2006	*Anna ALBERINI*: Determinants and Effects on Property Values of Participation in Voluntary Cleanup Programs: The Case of Colorado
CCMP	2.2006	*Valentina BOSETTI, Carlo CARRARO and Marzio GALEOTTI*: Stabilisation Targets, Technical Change and the Macroeconomic Costs of Climate Change Control
CCMP	3.2006	*Roberto ROSON*: Introducing Imperfect Competition in CGE Models: Technical Aspects and Implications
KTHC	4.2006	*Sergio VERGALLI*: The Role of Community in Migration Dynamics
SIEV	5.2006	*Fabio GRAZI, Jeroen C.J.M. van den BERGH and Piet RIETVELD*: Modeling Spatial Sustainability: Spatial Welfare Economics versus Ecological Footprint
CCMP	6.2006	*Olivier DESCHENES and Michael GREENSTONE*: The Economic Impacts of Climate Change: Evidence from Agricultural Profits and Random Fluctuations in Weather
PRCG	7.2006	*Michele MORETTO and Paola VALBONESE*: Firm Regulation and Profit-Sharing: A Real Option Approach
SIEV	8.2006	*Anna ALBERINI and Aline CHIABAI*: Discount Rates in Risk v. Money and Money v. Money Tradeoffs
CTN	9.2006	*Jon X. EGUIA*: United We Vote
CTN	10.2006	*Shao CHIN SUNG and Dinko DIMITRO*: A Taxonomy of Myopic Stability Concepts for Hedonic Games
NRM	11.2006	*Fabio CERINA* (lxxviii): Tourism Specialization and Sustainability: A Long-Run Policy Analysis
NRM	12.2006	*Valentina BOSETTI, Mariaester CASSINELLI and Alessandro LANZA* (lxxviii): Benchmarking in Tourism Destination, Keeping in Mind the Sustainable Paradigm
CCMP	13.2006	*Jens HORBACH*: Determinants of Environmental Innovation – New Evidence from German Panel Data Sources
KTHC	14.2006	*Fabio SABATINI*: Social Capital, Public Spending and the Quality of Economic Development: The Case of Italy
KTHC	15.2006	*Fabio SABATINI*: The Empirics of Social Capital and Economic Development: A Critical Perspective
CSRM	16.2006	*Giuseppe DI VITA*: Corruption, Exogenous Changes in Incentives and Deterrence
CCMP	17.2006	*Rob B. DELLINK and Marjan W. HOFKES*: The Timing of National Greenhouse Gas Emission Reductions in the Presence of Other Environmental Policies
IEM	18.2006	*Philippe QUIRION*: Distributional Impacts of Energy-Efficiency Certificates Vs. Taxes and Standards
CTN	19.2006	*Somdeb LAHIRI*: A Weak Bargaining Set for Contract Choice Problems
CCMP	20.2006	*Massimiliano MAZZANTI and Roberto ZOBOLI*: Examining the Factors Influencing Environmental Innovations
SIEV	21.2006	*Y. Hossein FARZIN and Ken-ICHI AKAO*: Non-pecuniary Work Incentive and Labor Supply
CCMP	22.2006	*Marzio GALEOTTI, Matteo MANERA and Alessandro LANZA*: On the Robustness of Robustness Checks of the Environmental Kuznets Curve
NRM	23.2006	*Y. Hossein FARZIN and Ken-ICHI AKAO*: When is it Optimal to Exhaust a Resource in a Finite Time?
NRM	24.2006	*Y. Hossein FARZIN and Ken-ICHI AKAO*: Non-pecuniary Value of Employment and Natural Resource Extinction
SIEV	25.2006	*Lucia VERGANO and Paulo A.L.D. NUNES:* Analysis and Evaluation of Ecosystem Resilience: An Economic Perspective
SIEV	26.2006	*Danny CAMPBELL, W. George HUTCHINSON and Riccardo SCARPA*: Using Discrete Choice Experiments to Derive Individual-Specific WTP Estimates for Landscape Improvements under Agri-Environmental Schemes Evidence from the Rural Environment Protection Scheme in Ireland
KTHC	27.2006	*Vincent M. OTTO, Timo KUOSMANEN and Ekko C. van IERLAND*: Estimating Feedback Effect in Technical Change: A Frontier Approach
CCMP	28.2006	*Giovanni BELLA*: Uniqueness and Indeterminacy of Equilibria in a Model with Polluting Emissions
IEM	29.2006	*Alessandro COLOGNI and Matteo MANERA*: The Asymmetric Effects of Oil Shocks on Output Growth: A Markov-Switching Analysis for the G-7 Countries
KTHC	30.2006	*Fabio SABATINI*: Social Capital and Labour Productivity in Italy
ETA	31.2006	*Andrea GALLICE* (lxxix): Predicting one Shot Play in 2x2 Games Using Beliefs Based on Minimax Regret
IEM	32.2006	*Andrea BIGANO and Paul SHEEHAN*: Assessing the Risk of Oil Spills in the Mediterranean: the Case of the Route from the Black Sea to Italy
NRM	33.2006	*Rinaldo BRAU and Davide CAO* (lxxviii): Uncovering the Macrostructure of Tourists' Preferences. A Choice Experiment Analysis of Tourism Demand to Sardinia
CTN	34.2006	*Parkash CHANDER and Henry TULKENS*: Cooperation, Stability and Self-Enforcement in International Environmental Agreements: A Conceptual Discussion
IEM	35.2006	*Valeria COSTANTINI and Salvatore MONNI*: Environment, Human Development and Economic Growth
ETA	36.2006	*Ariel RUBINSTEIN* (lxxix): Instinctive and Cognitive Reasoning: A Study of Response Times

ETA	37.2006	*Maria SALGADO* (lxxix): Choosing to Have Less Choice
ETA	38.2006	*Justina A.V. FISCHER and Benno TORGLER*: Does Envy Destroy Social Fundamentals? The Impact of Relative Income Position on Social Capital
ETA	39.2006	*Benno TORGLER, Sascha L. SCHMIDT and Bruno S. FREY*: Relative Income Position and Performance: An Empirical Panel Analysis
CCMP	40.2006	*Alberto GAGO, Xavier LABANDEIRA, Fidel PICOS And Miguel RODRÍGUEZ*: Taxing Tourism In Spain: Results and Recommendations
IEM	41.2006	*Karl van BIERVLIET, Dirk Le ROY and Paulo A.L.D. NUNES*: An Accidental Oil Spill Along the Belgian Coast: Results from a CV Study
CCMP	42.2006	*Rolf GOLOMBEK and Michael HOEL*: Endogenous Technology and Tradable Emission Quotas
KTHC	43.2006	*Giulio CAINELLI and Donato IACOBUCCI*: The Role of Agglomeration and Technology in Shaping Firm Strategy and Organization
CCMP	44.2006	*Alvaro CALZADILLA, Francesco PAULI and Roberto ROSON*: Climate Change and Extreme Events: An Assessment of Economic Implications
SIEV	45.2006	*M.E. KRAGT, P.C. ROEBELING and A. RUIJS*: Effects of Great Barrier Reef Degradation on Recreational Demand: A Contingent Behaviour Approach
NRM	46.2006	*C. GIUPPONI, R. CAMERA, A. FASSIO, A. LASUT, J. MYSIAK and A. SGOBBI*: Network Analysis, Creative System Modelling and DecisionSupport: *The NetSyMoD Approach*
KTHC	47.2006	*Walter F. LALICH* (lxxx): Measurement and Spatial Effects of the Immigrant Created Cultural Diversity in Sydney
KTHC	48.2006	*Elena PASPALANOVA* (lxxx): Cultural Diversity Determining the Memory of a Controversial Social Event
KTHC	49.2006	*Ugo GASPARINO, Barbara DEL CORPO and Dino PINELLI* (lxxx): Perceived Diversity of Complex Environmental Systems: Multidimensional Measurement and Synthetic Indicators
KTHC	50.2006	*Aleksandra HAUKE* (lxxx): Impact of Cultural Differences on Knowledge Transfer in British, Hungarian and Polish Enterprises
KTHC	51.2006	*Katherine MARQUAND FORSYTH and Vanja M. K. STENIUS* (lxxx): The Challenges of Data Comparison and Varied European Concepts of Diversity
KTHC	52.2006	*Gianmarco I.P. OTTAVIANO and Giovanni PERI* (lxxx): Rethinking the Gains from Immigration: Theory and Evidence from the U.S.
KTHC	53.2006	*Monica BARNI* (lxxx): From Statistical to Geolinguistic Data: Mapping and Measuring Linguistic Diversity
KTHC	54.2006	*Lucia TAJOLI and Lucia DE BENEDICTIS* (lxxx): Economic Integration and Similarity in Trade Structures
KTHC	55.2006	*Suzanna CHAN* (lxxx): "God's Little Acre" and "Belfast Chinatown": Diversity and Ethnic Place Identity in Belfast
KTHC	56.2006	*Diana PETKOVA* (lxxx): Cultural Diversity in People's Attitudes and Perceptions
KTHC	57.2006	John J. *BETANCUR* (lxxx): From Outsiders to On-Paper Equals to Cultural Curiosities? The Trajectory of Diversity in the USA
KTHC	58.2006	*Kiflemariam HAMDE* (lxxx): Cultural Diversity A Glimpse Over the Current Debate in Sweden
KTHC	59.2006	*Emilio GREGORI* (lxxx): Indicators of Migrants' Socio-Professional Integration
KTHC	60.2006	*Christa-Maria LERM HAYES* (lxxx): Unity in Diversity Through Art? Joseph Beuys' Models of Cultural Dialogue
KTHC	61.2006	*Sara VERTOMMEN and Albert MARTENS* (lxxx): Ethnic Minorities Rewarded: Ethnostratification on the Wage Market in Belgium
KTHC	62.2006	*Nicola GENOVESE and Maria Grazia LA SPADA* (lxxx): Diversity and Pluralism: An Economist's View
KTHC	63.2006	*Carla BAGNA* (lxxx): Italian Schools and New Linguistic Minorities: Nationality Vs. Plurilingualism. Which Ways and Methodologies for Mapping these Contexts?
KTHC	64.2006	*Vedran OMANOVIĆ* (lxxx): Understanding "Diversity in Organizations" Paradigmatically and Methodologically
KTHC	65.2006	*Mila PASPALANOVA* (lxxx): Identifying and Assessing the Development of Populations of Undocumented Migrants: The Case of Undocumented Poles and Bulgarians in Brussels
KTHC	66.2006	*Roberto ALZETTA* (lxxx): Diversities in Diversity: Exploring Moroccan Migrants' Livelihood in Genoa
KTHC	67.2006	*Monika SEDENKOVA and Jiri HORAK* (lxxx): Multivariate and Multicriteria Evaluation of Labour Market Situation
KTHC	68.2006	*Dirk JACOBS and Andrea REA* (lxxx): Construction and Import of Ethnic Categorisations: "Allochthones" in The Netherlands and Belgium
KTHC	69.2006	*Eric M. USLANER* (lxxx): Does Diversity Drive Down Trust?
KTHC	70.2006	*Paula MOTA SANTOS and João BORGES DE SOUSA* (lxxx): Visibility & Invisibility of Communities in Urban Systems
ETA	71.2006	*Rinaldo BRAU and Matteo LIPPI BRUNI*: Eliciting the Demand for Long Term Care Coverage: A Discrete Choice Modelling Analysis
CTN	72.2006	*Dinko DIMITROV and Claus-JOCHEN HAAKE*: Coalition Formation in Simple Games: The Semistrict Core
CTN	73.2006	*Ottorino CHILLEM, Benedetto GUI and Lorenzo ROCCO*: On The Economic Value of Repeated Interactions Under Adverse Selection
CTN	74.2006	*Sylvain BEAL and Nicolas QUÉROU*: Bounded Rationality and Repeated Network Formation
CTN	75.2006	*Sophie BADE, Guillaume HAERINGER and Ludovic RENOU*: Bilateral Commitment
CTN	76.2006	*Andranik TANGIAN*: Evaluation of Parties and Coalitions After Parliamentary Elections
CTN	77.2006	*Rudolf BERGHAMMER, Agnieszka RUSINOWSKA and Harrie de SWART*: Applications of Relations and Graphs to Coalition Formation
CTN	78.2006	*Paolo PIN*: Eight Degrees of Separation
CTN	79.2006	*Roland AMANN and Thomas GALL*: How (not) to Choose Peers in Studying Groups

CTN	80.2006	*Maria MONTERO*: Inequity Aversion May Increase Inequity
CCMP	81.2006	*Vincent M. OTTO, Andreas LÖSCHEL and John REILLY*: Directed Technical Change and Climate Policy
CSRM	82.2006	*Nicoletta FERRO*: Riding the Waves of Reforms in Corporate Law, an Overview of Recent Improvements in Italian Corporate Codes of Conduct
CTN	83.2006	*Siddhartha BANDYOPADHYAY and Mandar OAK*: Coalition Governments in a Model of Parliamentary Democracy
PRCG	84.2006	*Raphaël SOUBEYRAN*: Valence Advantages and Public Goods Consumption: Does a Disadvantaged Candidate Choose an Extremist Position?
CCMP	85.2006	*Eduardo L. GIMÉNEZ and Miguel RODRÍGUEZ*: Pigou's Dividend versus Ramsey's Dividend in the Double Dividend Literature
CCMP	86.2006	*Andrea BIGANO, Jacqueline M. HAMILTON and Richard S.J. TOL*: The Impact of Climate Change on Domestic and International Tourism: A Simulation Study
KTHC	87.2006	*Fabio SABATINI*: Educational Qualification, Work Status and Entrepreneurship in Italy an Exploratory Analysis
CCMP	88.2006	*Richard S.J. TOL*: The Polluter Pays Principle and Cost-Benefit Analysis of Climate Change: An Application of *Fund*
CCMP	89.2006	*Philippe TULKENS and Henry TULKENS*: The White House and The Kyoto Protocol: Double Standards on Uncertainties and Their Consequences
SIEV	90.2006	*Andrea M. LEITER and Gerald J. PRUCKNER*: Proportionality of Willingness to Pay to Small Risk Changes – The Impact of Attitudinal Factors in Scope Tests
PRCG	91.2006	*Raphäel SOUBEYRAN*: When Inertia Generates Political Cycles
CCMP	92.2006	*Alireza NAGHAVI*: Can R&D-Inducing Green Tariffs Replace International Environmental Regulations?
CCMP	93.2006	*Xavier PAUTREL*: Reconsidering The Impact of Environment on Long-Run Growth When Pollution Influences Health and Agents Have Finite-Lifetime
CCMP	94.2006	*Corrado Di MARIA and Edwin van der WERF*: Carbon Leakage Revisited: Unilateral Climate Policy with Directed Technical Change
CCMP	95.2006	*Paulo A.L.D. NUNES and Chiara M. TRAVISI*: Comparing Tax and Tax Reallocations Payments in Financing Rail Noise Abatement Programs: Results from a CE valuation study in Italy
CCMP	96.2006	*Timo KUOSMANEN and Mika KORTELAINEN*: Valuing Environmental Factors in Cost-Benefit Analysis Using Data Envelopment Analysis
KTHC	97.2006	*Dermot LEAHY and Alireza NAGHAVI*: Intellectual Property Rights and Entry into a Foreign Market: FDI vs. Joint Ventures
CCMP	98.2006	*Inmaculada MARTÍNEZ-ZARZOSO, Aurelia BENGOCHEA-MORANCHO and Rafael MORALES LAGE:* The Impact of Population on CO2 Emissions: Evidence from European Countries
PRCG	99.2006	*Alberto CAVALIERE and Simona SCABROSETTI*: Privatization and Efficiency: From Principals and Agents to Political Economy
NRM	100.2006	*Khaled ABU-ZEID and Sameh AFIFI*: Multi-Sectoral Uses of Water & Approaches to DSS in Water Management in the NOSTRUM Partner Countries of the Mediterranean
NRM	101.2006	*Carlo GIUPPONI, Jaroslav MYSIAK and Jacopo CRIMI*: Participatory Approach in Decision Making Processes for Water Resources Management in the Mediterranean Basin
CCMP	102.2006	*Kerstin RONNEBERGER, Maria BERRITTELLA, Francesco BOSELLO and Richard S.J. TOL*: Klum@Gtap: Introducing Biophysical Aspects of Land-Use Decisions Into a General Equilibrium Model A Coupling Experiment
KTHC	103.2006	*Avner BEN-NER, Brian P. McCALL, Massoud STEPHANE, and Hua WANG*: Identity and Self-Other Differentiation in Work and Giving Behaviors: Experimental Evidence
SIEV	104.2006	*Aline CHIABAI and Paulo A.L.D. NUNES*: Economic Valuation of Oceanographic Forecasting Services: A Cost-Benefit Exercise
NRM	105.2006	*Paola MINOIA and Anna BRUSAROSCO*: Water Infrastructures Facing Sustainable Development Challenges: Integrated Evaluation of Impacts of Dams on Regional Development in Morocco
PRCG	106.2006	*Carmine GUERRIERO*: Endogenous Price Mechanisms, Capture and Accountability Rules: Theory and Evidence
CCMP	107.2006	*Richard S.J. TOL, Stephen W. PACALA and Robert SOCOLOW*: Understanding Long-Term Energy Use and Carbon Dioxide Emissions in the Usa
NRM	108.2006	*Carles MANERA and Jaume GARAU TABERNER*: The Recent Evolution and Impact of Tourism in the Mediterranean: The Case of Island Regions, 1990-2002
PRCG	109.2006	*Carmine GUERRIERO*: Dependent Controllers and Regulation Policies: Theory and Evidence
KTHC	110.2006	*John FOOT* (lxxx): Mapping Diversity in Milan. Historical Approaches to Urban Immigration
KTHC	111.2006	*Donatella CALABI*: Foreigners and the City: An Historiographical Exploration for the Early Modern Period
IEM	112.2006	*Andrea BIGANO, Francesco BOSELLO and Giuseppe MARANO*: Energy Demand and Temperature: A Dynamic Panel Analysis
SIEV	113.2006	*Anna ALBERINI, Stefania TONIN, Margherita TURVANI and Aline CHIABAI*: Paying for Permanence: Public Preferences for Contaminated Site Cleanup
CCMP	114.2006	*Vivekananda MUKHERJEE and Dirk T.G. RÜBBELKE*: Global Climate Change, Technology Transfer and Trade with Complete Specialization
NRM	115.2006	*Clive LIPCHIN*: A Future for the Dead Sea Basin: Water Culture among Israelis, Palestinians and Jordanians
CCMP	116.2006	*Barbara BUCHNER, Carlo CARRARO and A. Denny ELLERMAN*: The Allocation of European Union Allowances: Lessons, Unifying Themes and General Principles
CCMP	117.2006	*Richard S.J. TOL*: Carbon Dioxide Emission Scenarios for the Usa

(lxxviii) This paper was presented at the Second International Conference on "Tourism and Sustainable Economic Development - Macro and Micro Economic Issues" jointly organised by CRENoS (Università di Cagliari and Sassari, Italy) and Fondazione Eni Enrico Mattei, Italy, and supported by the World Bank, Chia, Italy, 16-17 September 2005.
(lxxix) This paper was presented at the International Workshop on "Economic Theory and Experimental Economics" jointly organised by SET (Center for advanced Studies in Economic Theory, University of Milano-Bicocca) and Fondazione Eni Enrico Mattei, Italy, Milan, 20-23 November 2005. The Workshop was co-sponsored by CISEPS (Center for Interdisciplinary Studies in Economics and Social Sciences, University of Milan-Bicocca).
(lxxx) This paper was presented at the First EURODIV Conference "Understanding diversity: Mapping and measuring", held in Milan on 26-27 January 2006 and supported by the Marie Curie Series of Conferences "Cultural Diversity in Europe: a Series of Conferences.

2006 SERIES	
CCMP	*Climate Change Modelling and Policy* (Editor: Marzio Galeotti)
SIEV	*Sustainability Indicators and Environmental Valuation* (Editor: Anna Alberini)
NRM	*Natural Resources Management* (Editor: Carlo Giupponi)
KTHC	*Knowledge, Technology, Human Capital* (Editor: Gianmarco Ottaviano)
IEM	*International Energy Markets* (Editor: Matteo Manera)
CSRM	*Corporate Social Responsibility and Sustainable Management* (Editor: Giulio Sapelli)
PRCG	*Privatisation Regulation Corporate Governance* (Editor: Bernardo Bortolotti)
ETA	*Economic Theory and Applications* (Editor: Carlo Carraro)
CTN	*Coalition Theory Network*