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# A Note on Openness and Economic Growth in Italy, 1861-1994

*Patrizia Margani & Roberto Ricciuti\**

**Abstract:** »Anmerkung über Offenheit und Wirtschaftswachstum in Italien, 1861-1994«. This paper analyzes the long-run relationship between trade (exports, imports and their sum) and growth for Italy using a nonparametric cointegration approach, which is less demanding than conventional methods in terms of assumptions on the data generating process. We find a positive correlation between these variables. We relate this result with historical developments.

**Keywords:** Economic cycles, Italy, Cliometrics.

## Introduction

The Italian economy has historically been one of the most successful in terms of growth and exports, especially after World War II. This note aims at analyzing the nexus between openness and growth over the long-run.

In the Italian economic history a great deal of interest has been received by protectionism, which started with the trade tariff in 1882 – which contradicted the free-trade stance that the Kingdom pursued before Unification in 1861 - and became more important in 1887. Scholars like Gershenkron (1962) and Fenoaltea (2006) claim that the choice of the protected sectors was detrimental to growth (higher prices on iron and steel – which Italy did not produce much for lack of comparative advantage – had negative effects on engineering and metal). Furthermore, Italy needed to import more grain, and higher prices reduced real wages and led to migrations. In contrast, Zamagni (1993) and Pescosolido (1998), applying an infant industry argument, maintained that without protection Italian industry would have not been able to survive foreign competition, and therefore Italy would not have developed.

The fascist regime (1922-1944) imposed autarchy promoting an import-substitution policy, and at the same time Italy was hit by the Great Depression. After World War II Italy joined the international institutions led by the United States and received funding under the European Recovery Programme. Furthermore, it participated to the establishment of European institutions: the CECA (1951), and the Treaty of Rome (1957). From 1951 to 1963 Italy ex-

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perienced the ‘economic miracle’: per-capita GDP grew at 5.1% on average. Productivity growth accounted for 80% of this performance. Ciocca (2007) maintains that this growth was not export-led, but based on capital accumulation and technological progress.<sup>1</sup>

The literature has emphasized the role of trade as an “engine” of growth. There are various channels through which export performance can positively influence the economic development of a country. First, openness exposes countries to increased competition, enhancing efficiency (Krueger, 1980). Second, exports contribute to a relaxation of foreign exchange constraints that generally prevent economic development (Chenery and Strout, 1966). Third, exports produce economies of scales for poor countries with narrow domestic markets (Helpman and Krugman, 1985). Moreover, Grossman and Helpman (1991) and Rivera-Batiz and Romer (1991) stress the importance of R&D, increasing returns to scale and technological spillovers caused by trade: a large international market raises the temporary monopoly gains to innovators, resulting in more R&D and faster growth.

On the empirical side, the relation between trade and growth has failed in providing a uniform support for the hypothesis. Earlier works using cross-sectional data and empirical growth theories have suggested this relationship to hold (Michealy, 1977; Balassa, 1978; Barro and Sala-i-Martin, 1992), several more recent time-series studies have put this issue into doubt, maintaining either a reverse causation or no relationship at all (Bahamani-Oskooee and Niroomand, 1999; Jung e Marshall, 1985; Panas e Vamvoukas, 2002; Xu, 1996).<sup>2</sup>

The paper is organized as follows: Section II presents the new methodology implemented here and presents the data, Section III reports the empirical evidence, and Section IV concludes linking this paper with previous literature.

## Methodology and Data

All cointegration approaches in the literature require consistent estimation of nuisance and/or structural parameters. Bierens (1997) proposes consistent cointegration tests that do not need specification of the data-generating process (apart from some mild regularity conditions), or estimation of nuisance parameters. These tests are nonparametric and are analogous to Johansen tests (Johansen, 1988; Johansen and Juselius, 1990). They allow testing for the

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<sup>1</sup> However, for a longer time-span than those considered by Ciocca – but considerably smaller than ours – Federici and Marconi (2002) test the export-led growth hypothesis for the Italian economy (1960-98) through a 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. Their results support the hypothesis.

<sup>2</sup> For a detailed discussion of this literature see Edwards (1998).

number of cointegrating vectors and for the estimation of a basis of the space of cointegrating vectors, using the eigenvectors of the generalized eigenvalue problem involved. These tests appear to be well suited for the problem at hand. Given the length of the time-span, the series might violate strong regularity conditions.

The test is based on a pair of random matrices:

$$\hat{A}_m = \sum_{k=1}^m a_{n,k} a_{n,k}^T, \hat{B}_m = \sum_{k=1}^m b_{n,k} b_{n,k}^T, \quad (1)$$

depending on a natural number  $m \geq q$ , where

$$a_{n,k} = \frac{M_n^z(F_k)/\sqrt{n}}{\sqrt{\int \int F_k(x)F_k(y) \min(x,y) dx dy}}, b_{n,k} = \frac{\sqrt{nM_n^{\Delta z}(F_k)}}{\sqrt{\int F_k(x)^2 dx}}, \quad (2)$$

with  $M_n^z(F_k) = \frac{1}{n} \sum_{t=1}^n F_k(t/n) z_t$ , and  $M_n^{\Delta z}(F_k) = \frac{1}{n} \sum_{t=1}^n F_k(t/n) \Delta z_t$ , where

$\{F_k\}$  is a class of differentiable real functions on the interval  $[0,1]$ .<sup>3</sup> Choosing  $P_n = \hat{A}_m$  and  $Q_n = \hat{B}_m + n^{-2} c \hat{A}_m^{-1}$  we obtain a suitable pair  $(P_n, Q_n)$ , such that the ordered solutions of the generalized eigenvalue problem  $\det(P_n - \lambda Q_n) = 0$  converge in distribution to the generalized eigenvalue problem  $\det(P - \lambda Q) = 0$ , where  $Q$  is a.s. nonsingular. If  $\text{rank}(C(1)C(1)T) = q - r$ , then the  $q - r$  largest solutions of  $\det(P - \lambda Q) = 0$  are a.s. positive and free of nuisance parameters, whereas  $r$  smallest solutions are zero. In order to be scale-invariant, one should take the logs of each series and set the parameter  $c$  equal to one. Monte Carlo simulations show that the power of this nonparametric test is good compared with the standard Johansen test when the fit of the cointegration regression is not low. In our case this fit is 0.461, which we believe is fairly high.

Data are expressed in real terms. Nominal values for gross domestic product (*GDP*) are taken from Fenoltea (2005) from 1861 to 1914, and from Fratianni and Spinelli (1991) until 1980. Export (*EXP*) and import (*IMP*), together with the relevant deflators for the period 1861-1980 are taken from Fratianni and Spinelli (1991). For the subsequent period they are taken from Istat (various years). Openness (*OPEN*) is the sum of *EXP* and *IMP*. All variables are expressed as ratios to *GDP*.

<sup>3</sup> The function  $F$  is chosen as  $F_k(x) = \cos(2knx)$ . See Bierens (1997) for a full derivation of the results.

## Results

Before testing for cointegration, we need to assess the order of integration of individual variables. Therefore, we apply the ADF test (Fuller, 1996) where the null hypothesis of unit root with drift is tested against the alternative of linear trend stationarity, and the KPSS test (Kwiatkowski *et al.* 1992) where the null hypothesis is the stationarity of the process, and the alternative is unit root with drift. The lag-length of the ADF test is selected according to the Schwarz-Bayes Information Criterion (SBIC). The truncation lag in the KPSS test is determined according to the formula  $m = cn^r$ , where  $n$  is the number of observations and  $c$  and  $r$  are set equal to 5 and 0.25, respectively. The performed tests consistently (Table 1) maintain that all the series are  $I(1)$  processes with drift, since they have a unit root in logs and are stationary in the first-difference of logs.

Given the nonstationarity of all series, we can perform pairs of cointegration test using the Bierens nonparametric method (Table 2). Tests show that each pair of variables has one cointegrating vector, since all test statistics concerning the null hypotheses  $r = 0$  lie within the critical regions, and all those for the null  $r = 1$  lie outside that region.<sup>4</sup> Setting the normalized cointegrating vector of  $\ln RGDP$  equal to -1, the corresponding cointegrating vectors of  $\ln REXP$ ,  $\ln RIMP$ , and  $\ln ROPEN$  are: 0.3121, 0.4584, and 0.3935, respectively. These results show a positive effect between trade and growth.

## Conclusions

In this note we have assessed the long-run relationship between openness and economic growth for the Italian economy. In 133 years it started as a rural country and then has become one of the most industrialized in the world. The growing openness to foreign trade has played an important role in this achievement.

Our results are in line with those of Afxentiou and Serletis (1992) that find evidence of the positive correlation between trade and growth for the Canadian economy, but not for the opposite as we did (the so-called Kaldor (1967) hypothesis) in a comparable time-span. In contrast, Vamvakidis (2002) claims that looking at the evidence for a cross-section of countries from 1870 to present the relationship between trade and growth does not exist. It becomes positive only in relatively recent periods.

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<sup>4</sup> Bierens (1997) also provides a direct test for the number of cointegrating vectors – called  $\hat{g}(r)$  – that he suggests to use as a check for the results obtained with the method we have used. Results for this statistic led to the same conclusion of the previous tests, and are available upon request from the authors.

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## Appendix

Table 1. Unit roots and stationarity tests

	ADF		KPSS
	Test statistics	SBIC	Test statistics
lnRGDP	-1.7729	1	0.1922
$\Delta$ lnRGDP	-5.6921	3	0.0605
lnREXP	-1.2889	2	0.1838
$\Delta$ lnREXP	-5.8693	4	0.0808
lnRIMP	-1.2290	1	0.1675
$\Delta$ lnRIMP	-6.0988	3	0.0677
lnOPEN	-1.2046	1	0.1775
$\Delta$ lnOPEN	-5.6942	3	0.0765

Critical values for the ADF test are  $<-3.40$  and  $<-3.13$  at the 5% and 10% significance level, respectively. For the KPSS test they are  $>0.146$  and  $>0.119$  at same significance levels.

Table 2. Cointegration tests

	H <sub>0</sub>	H <sub>1</sub>	Test statistics
lnRGDP, lnREXP	r = 0	r = 1	0.0002
	r = 1	r = 2	1.3100
lnRGDP, lnRIMP	r = 0	r = 1	0.0000
	r = 1	r = 2	0.7194
lnRGDP, lnOPEN	r = 0	r = 1	0.0000
	r = 1	r = 2	0.9863

For the null  $r = 0$  the 5% critical region lies between 0 and 0.017, whereas the 10% critical region lies between 0 and 0.005. For the null  $r = 1$  they are (0-0.054) and (0-0.111), respectively.