1998

International Openness, Technology and Productivity: An empirical Investigation for Italy

Roberta De Santis

INTERNATIONAL OPENNESS, TECHNOLOGY AND PRODUCTIVITY: AN EMPIRICAL INVESTIGATION FOR ITALY

Di Roberta De Santis[*]

Abstract: Is international openness associated with faster economic growth? This paper tries to establish the effect of technology and market opening on labour productivity in Italy. The simple model developed in this paper shows that more open economies have higher rate of technical progress, higher productivity and higher GDP. The model assumes that there are two sources of technical progress growth: a domestic source, associated with innovation (i.e. R&D) and an international one, related to the rate at which the country is able to imitate technological progress originated in the leading innovating nations. According to this model in Italy the internationalisation process, due to the excess of sheltered sectors over the exposed ones, may cause, on average, a lowering of the Italian productivity.

1.Introduction

This paper uses Italian data from 1970 to 1993 to establish the effect of technology and market opening on labour productivity. Data show that there is a positive correlation among technology, market opening and labour productivity.

According to the simple model developed in this paper countries with a more open economy will have an higher stock of knowledge and higher rate of technical progress. This causes, given the other variables, higher productivity and GDP.

An important property of the model is that countries exposed to international competition will experience transitional productivity growth, that exceeds that of countries that are sheltered.

The Italian economy is characterised by a wide structural dualism i.e. different productivity and inflation rate between sectors exposed to international competition and sectors sheltered. According to 1993 data firms in sheltered sectors, i.e. price makers, produced[1] the 70% about of the GDP. In the framework of the globalisation process (i.e. increasing degrees of competition) the Italian industrial dualism between exposed and sheltered sectors may increase the price gap between Italy and the most industrialised countries lowering the Italian competitiveness.

After this short introduction the paper is organised as follows: section two presents a brief survey of the literature about the effects of technology on productivity and growth in the framework of the globalisation process; section three analyses the issue of the dualism of the Italian productive sectors; section four presents the model; section five examines the data and some estimates problems; section six presents the test of the model and the interpretation of the results and section seven presents some policy implications.

---

[*] LUISS Guido Carli University, department of Economics
[1] In Italy, Scandizzo P.L., Milana C. (1991) the exposed sectors are Manufacturing; Chemicals and Pharmaceuticals; Food, Beverage and Tobacco;Wearing Apparel and Leather Industries; Textile; Other Manufacturing Industries; the protected sectors are Electricity, Construction, Transport, Storage and Communication, Other services, Government Services. Data are disaggregated in productive sectors according to the ISTAT (National Italian Statistic Institute) sectorial statistic. However within the sectors it is not possible to check the difference between exposed and protected sectors for the single firms.

2. A brief survey of literature

The globalisation process has sparked an extensive economic literature, mostly in the area of trade theory dealing with the effects of economic integration on trade and resource allocation.

The idea of a strong link between the wealth of nations and international trade dates back to Adam Smith, but it is far from being universally accepted. Economists disagree on the effects of international competitiveness on a country's productivity and welfare. According to the classical theory, technology is exogenous and competitiveness is related to "comparative advantages", which determine a country's productive specialisation. Based on the assumption that technology is equally available to any country and that inputs are of equal quality for all the nations, specialisation is linked only to the original endowment of resources.

The standard theory of international trade has been for a long time the Heckscher-Ohlin theory. In the framework of the Walrasian static model, the Heckscher-Ohlin theory accepts Ricardo's law of comparative advantages. It assumes perfect competition, market clearance, perfect information and exogenous and free technology. In such a scenario, trade fosters economic differences and the advantages of specialisation. Competitiveness gaps among countries do not affect the welfare of less competitive countries. On the contrary, the gaps themselves are source of international trade. Cross-border exchanges improve the welfare of all the countries concerned through a better resource allocation. In the classic theory, therefore, price and exchange rate flexibility clears the market and balances the differences in competitiveness.

There is no direct relationship between a country's comparative advantages and its productivity. Competitiveness depends on the relative cost of factors, which is linked to their relative scarcity. Productivity depends instead on technology, which is, by assumption, the same for any country. A change in the endowment of factors may accordingly determine a change in specialisation, but not in productivity.

Comparative advantage depends on the original endowment of factors which in this view cannot be altered because resources are not mobile. In addition, technical innovation, the basis of improvements in comparative advantages, is exogenous and therefore not affectable. As a consequence, Classical theory supports the "laissez faire" policy. The market itself keeps the system in equilibrium and allows for the best resource allocation. In the framework of Classical theory economic policies are therefore ineffective in modifying a country's international competitiveness.

At the end of the 1970s the New International Trade Theory turned back to A. Smith's original ideas in seeking to demonstrate a relationship between trade and growth in the framework of the globalisation process. Until recently, however, such studies did not take into account the dynamic effects of integration, i.e. the effect of integration on economic growth through its impact on capital accumulation and technological change.

The development of endogeneous growth models (Romer 1990, Lucas 1988, Krugman, 1990) provides a tool to analyse the long-run effects of international and regional integration. With the help of the endogeneous growth framework, a new body of literature has recently emerged, dealing with the long-run effects of liberalisation of trade and factors flows. This literature concentrates on the effect of greater openness of economies on the rate of technological change and consequently, the growth rate.

Following Romer (1986) researchers have developed a broad range of models in which in contrast to growth model in the Solowian tradition, the growth rate approaches a positive constant in the long-run. The literature relating integration to growth has almost exclusively employed growth models with endogeneous technological change. This is partly a

consequence of the opinion shared by most researchers that technological change is the main driving force of economic growth. In the absence of technological change, capital accumulation would run into diminishing returns and finally approach a stationary steady state.

Endogeneizing technological change in a growth framework is being regarded as the most important merit of endogeneous growth theory. The rate of technological change is also considered to be affected the most in the course of integration. At the level of model-building - due to their much richer microeconomic structure allowing for the analysis of important aspects of economic integration- growth models with endogeneous technological change are most suitable for this task.

3. The Italian structural "dualism"

The Italian economy is characterised by a wide structural dualism i.e. different productivity and inflation rate between sectors exposed to international competition and sectors sheltered. The size of this structural dualism is one of the major differences among Italy and the other industrialised countries (see Appendix I). It can be a relevant obstacle in the integration and growth process.

Fig.1

Exposed and Sheltered Sectors Unit Labour Product[2]
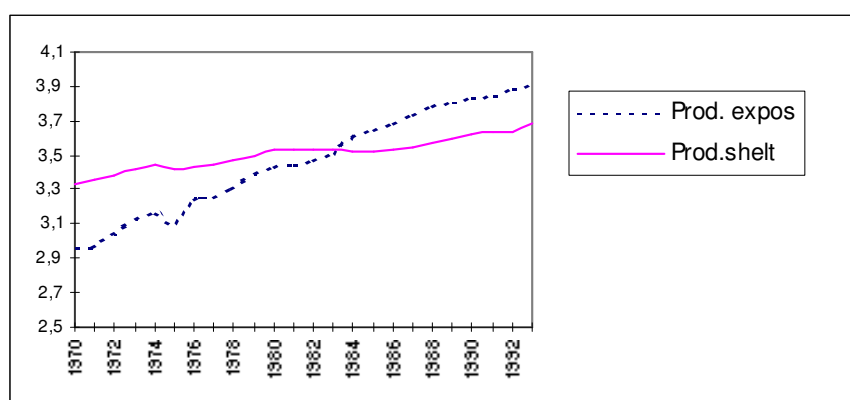
Source: Datastream

The analysis of the causes of the structural dualism can give advice on the adoption of the best policies to improve the competitiveness of Italy. The data show that competition increases the efficiency of production, reduces inflation and improves the competitiveness of the countries exposed to it (see Appendix I).

The National Accountancy data relating to the period 1970-93 show that the exposed and the sheltered sectors had different productivity and inflation rates. Sectors exposed to international competition had a yearly average increase of unit labour product by 4.33%. The

---

[2] The level of unit labour product for the period 1970-1983 is higher in the sheltered sectors than in the exposed sectors due to the high value added (i.e. telecommunication). For the whole period the dynamics in the sheltered sectors is lower than in the exposed sectors due to the lack of competition. The trend of the unit labour product in fact is increasing and more volatile in the exposed sectors, influenced by the exchange rate, than in the sheltered sectors.

sheltered sectors increased by only 1.08%. The increase of unit labour product of exposed sectors was due to an high increase of added value and a decrease in employment (-872.000 units)[3]. In 1993 the exposed sectors added value was 2.2 times bigger than the 1970 one and employment was 16% lower than the 1970 one.

In the sheltered sectors the added value had a limited increase and there was an increase in employment[4]. The increase of the added value in 1993 was 1.76 times the 1970 one, whereas employment rose by 24% amounting to 3.566.000 units. The exposed sectors in the period 1985-1983 had prices in line with the other industrialised countries (yearly average increase 3.87%) while the sheltered sector has an almost double inflation rate (6.60%). In spite of the labour productivity differential, wages were nearly the same.

Fig.2

Exposed and Sheltered Sectors Producer Prices
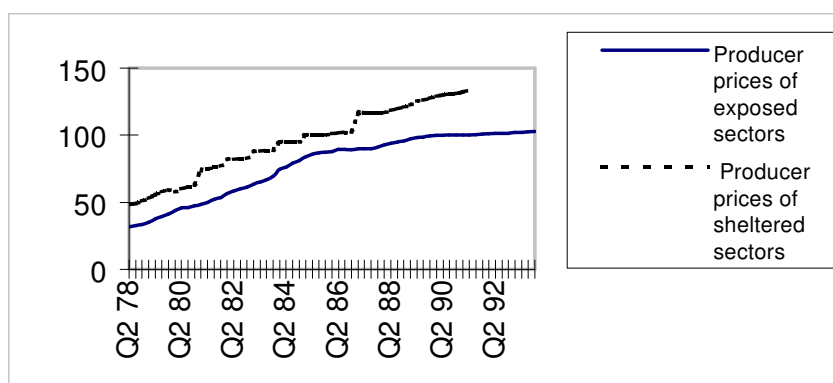
Source: Datastream

Data seem to show that, due to the lack of competition, in the sheltered sectors there was an increase in the employment not linked to productivity and financed through inflation. This process caused a shift of real resources from the exposed to the sheltered sectors. It was a crowding out process against the most productive side of Italian economy which lowered the international competitiveness of Italy (Savona 1993).

With respect to the international integration process the inflation gap with the other countries and the almost pegged exchange rate caused a productivity increase in the exposed sectors and a price increase in the protected sectors. The exposed sectors could not transfer all the increases in the cost of inputs on prices. Therefore they had to improve their productivity, the only endogenous variable.

The lack of competition allowed the sheltered sectors to increases prices in response to increases in input costs. Is estimated that in 1993 in Italy about 70% of the output was produced by sheltered firms. The integration process may then lead towards an increase in the inflation gap with respect to the other main European countries due to the predominance of firms belonging to the sheltered sectors with respect to those in exposed ones. The effect of

---

[3] Final Report of the Italian Research Center on International Economy, 1993, "The Italian Evolution Process in the International Economy: Development in the Framework of the European Union".

[4] It is worth to underline that the services sector in the sample period had a countercyclical function in term of employment.

the described process in the short run can be, on average, a lowering of the Italian competitiveness.

4.The model

Consider a standard aggregate production function where GDP depends on physical capital (K), labour (L) and the stock of knowledge or technical progress (A):

$$Yt = At\ f(Kt,\ Lt)\tag{4.1}$$

Productivity depends on the rate of change of these three factors. Since we want to analyse the effect of technical progress on productivity let us assume that there are two sources of technical progress growth: a domestic source, associated with innovation (i.e. R&D) and an international one, related to the rate at which the country is able to imitate technological progress originated in the leading innovating nations. The rate of domestic innovation is assumed to depend on the expenditure in Research & Development. The imitation is assumed to depend on a "catch-up" term.

Countries with a lower initial stock of knowledge and more open will tend to imitate faster than those with a higher initial stock of knowledge.

The rate of growth of A can be written as:

$$\frac{\dot{A}}{A} = \delta + \vartheta \frac{(W - A)}{A}\tag{4.2}$$

where W is the world stock of knowledge assumed to grow at rate of g; δ is the domestic rate of innovation assumed to depend on expenditure in R&D, and not to exceed g (i.e. $g >= \delta$). If the country is the leading innovating country $g = \delta$ and $W = A$. Finally ϑ is the speed at which the country closes the knowledge gap and is assumed to depend on national policies, including trade policy. In particular it is assumed that more open countries have a greater ability to absorb ideas from the rest of the world and, thus, have an higher ϑ. The country's stock of knowledge will converge to

$$\left[\frac{\vartheta}{(\vartheta + g - \delta)}\right]W\tag{4.3}$$

and there will be an equilibrium gap between the country's and the world level of A.

This model implies that countries with a more open economy will have an higher stock of knowledge, and given the other variables, higher productivity and GDP.

An important property of this simple model is that countries that are exposed to the international competition will experience transitional productivity growth that exceeds that of

countries "sheltered", due to the positive impact on productivity, via tecnology, of both terms: the domestic innovation term and the catch up term.

The basic hypotesis of this model is that in Italy there will be a greater increase in productivity, due to tecnological progress, in the exposed sectors. The protected sectors experience slower productivity growth because they do not have the positive impulse coming from the catch up term. Due to the predominance of firms belonging to the sheltered sectors, Italy might have slower productivity growth rate than other countries with more open economy.

5.Analysis of the data and estimates problem

In this model the determining factors of productivity growth are the following:

Technology (A), which is the list of all known techniques economically important which allow to combine inputs to make output. Competitive advantages are obtained and furthered through an intense and continuous technical progress. Technical progress is the result of the efforts of Research & Development. Expenditure in R&D is used as proxy of the level and degree of technical advance. This variable is used as proxi of the model's term of domestic innovation.

Exposure to international competition or Market Opening (MO), which is the degree of exposure to international competition that keeps track of the feedback effect of competition on productivity. The degree of opening of economy provides a synthetic indicator of structural conditions because of its tight link to institutions and organisations. This variable is used as proxi of the model's term of "catch up".

For the purposes of empirical estimates, the variables used are defined as follows:

- as indicator of productivity is used the unit labour product (ULP), namely the ratio of total output to the input of labour employed to obtain it;

- as indicator of output is used the value added at the cost of factors;

- as indicator of the labour input are used the number of total labour units;

- as proxy of technology, is used the expenditure in Research & Development of institutional sectors (firms and public bodies), constant price 1985;

- as proxy of the market opening is used the ratio of the volume of the sum of imports and exports to GDP[5].

The National Accounts of ISTAT (Italian National Statistic Institute) is the source of time-series for the period 1970-1993, yearly observations. The regressions are performed using Ordinary Least Square Method applied to data in logarithmic form[6] The estimated parameters

---

[5]For a survey on the measurement of openness see S. Edwards, (1997), "Openness, Productivity and Growth: What do We Really Know?", NBER 5978, Mass, Cambridge.
[6]The logarithmic form are useful to make series stationary in variance. "Basic Econometric Methods for the Analysis of Time Series", Golinelli R., CLUEB ed., Bologna, 1994.

may be interpreted as ULP elasticities with respect to the independent variables (*A, MO*). The independent variables are in lagged form because of the reasonable assumption that the passthrough of technology and market opening on productivity requires more than one period.

In the regressions the independent variables are one period lagged market opening and one period lagged technology to keep the effect of short term and long term institutional changes and technical innovations. We assume that the research of t-1 period can be assumed as a proxy of the technology of the t period (*At= R&D t-1*) and that the impulses of the competition of the t-1 period can be assumed as institutional changes (to increase the exposure of the economy to the international competition) of the t period.

From the econometric point of view the Augmented Dickey Fueller test performed for the variables series rejects a unit root null hypothesis (i.e. series are stationary) at 10 and 5 percent confidence level (see the Appendix II)[7]. Then the series used in the regressions are I(0).

6. Empirical testing of the model and interpretation of results

The first regression run is[8]:

$$\ln ULP = 0.38 \ln R\&D(-1) - 0.17 \ln MO(-1) \tag{6.1}$$
$$(12.93) \qquad (5.1)$$

$R^2adj = 0.935$
$SER = 0.02$
$D\text{-}W = 1.15$
$F = 115.297$
$Prob\ (F\text{-}test) = 0.000000$

Where:
ULP is the unit labour product;
R&D is the expenditure in Research & Development;
MO is an indicator of market opening.

The estimate shows a positive correlation between productivity and R&D in the periods t_{-1} ($c_1=0.38$) and a negative correlation between productivity and market opening ($c_2=-0.17$). The hypothesis of the model, i.e. positive correlation among ULP, R&D and MO, is rejected because of the negative correlation between market opening and productivity.

The second regression run tries to analyse this result: the regression has the same independent variables but the ULP of the exposed sectors as explained variable:

$$\ln ULPe = 0.43 \ln R\&D(-1) + 0.28 \ln MO(-1) \tag{6.2}$$
$$(9.55) \qquad (5.34)$$

$R2adj = 0.963$
$SER = 0.031$
$D\text{-}W = 2.06$
$F\text{-}test = 316.94$

---

[7] A caveat that has to be taken into consideration is that the confidence level of the variables in ADF test is at 5 or 10% but not at 1%. A more appropriate econometric tecniques to test the model migth be cointegration. The use of cointegration technique for the study of the productivity gap in sheltered and exposed sectors will be object of further investigation in future papers.

[8] In the parenthesis there is the T-Student value.

Prob (F-test) = 0.000000

where:
ULPe =unit labour product in exposed sectors.

This specification shows a positive correlation between technology and productivity and also between market opening and productivity (the model's hypothesis is accepted). The parameters seem to be consistent. In the exposed sectors market opening keeps track of the feedback effect of international competition on productivity and on competitiveness. The data show a international competition-productivity-competitiveness positive circular relation.

The negative effect of international competition seems to be due only to sheltered sectors. The sheltered sectors have not price constraints (i.e. price makers) and so they do not transfer the competition impulses on productivity. The sheltered sectors in Italy are about 70% and so their "price effect" can prevail on the "productivity effect" of exposed sectors.

The third run regression uses the same independent variables but the ULP of the sheltered sectors as dependent variable:

$$\ln ULPp = 0.37 \ln R\&D(-1) -0.30 \ln MO(-1) \tag{6.3}$$
$$(9.71) (7.15)$$

$R^2adj = 0.793$
SER = 0.026
D-W = 0.64
F-test= 47.03
Prob (F-test) = 0.000027

where:
ULPp = unit labour product in sheltered sectors

The regression confirms the previous results. There is a positive relation between technology and productivity but a negative relation between market opening and productivity, -0.30 (7.15) (model's hypothesis is rejected).

These empirical results seem to accept the model's hypothesis for the exposed sectors. The exposed sectors in fact, because of the constraints of international competition, increase the productivity and not the price (i.e. price takers). On the contrary the sheltered sectors by definition are not influenced by the international competition and they can increase prices more than the rest of the world. Moreover, recent empirical studies show that the technological innovation is concentrated in the exposed sectors[9]. The negative correlation between market opening and unit labor product in the sheltered sectors seems not to be in line with the expected results. According to the model in the sheltered sector the market opening should not have any impact. Nevertheless it has to be underlined that the regression's Durbin Watson is very low 0.64 and the coefficients seem to be not very significative.

7. Conclusions

---

[9]Archibugi D., Ceccagnoli M., Palma D., (1996).

This paper attempted to estimate if in Italy market openness and technology affect labour productivity positively. In analysing this issue we assume that market openness affects the ability to absorb technological advances generated in leading innovating nations

A thorough evaluation of the results of the statistical tests suggests a number of interesting implications.

1. The productivity of exposed and not exposed sectors seems to be positively related to technology. It should be noted, however, that Italy still has a lower technological intensity than most industrialised countries[10]. This suggests that an improvement in this factor might enhance Italian productivity and competitiveness. Recent studies show that investments in R&D, trademarks, patents and rights of use have the strongest influence on productivity, even though R&D is just an aspect of technical change whose mere increase would not be enough to fill the Italian technological gap.

The Italian "technological delay" is moreover partly linked to structural factors and has its roots in the particular composition of the industrial sectors: innovating activities of the enterprises are always positively related to some kind of internationalisation. There is a dichotomy between a section of the productive system which takes part in the process of technical innovation, mainly in exposed sectors, and the section which lies outside, mainly sheltered sectors.

Even if the technological gap mainly concerns sheltered sectors, it must be stressed, however, that it also regards the exposed sectors. The competitiveness of the Italian industry has always been concentrated on areas of activities where technological innovation does not play a fundamental role.

2. The exposure to international competition increases productivity in exposed sectors but not in the sheltered sectors[11].

Growing exposure to international competition in a globally integrated economy might in the short run worsen Italian competitiveness. The reasons may be found in the size of the sheltered sectors relative to exposed ones and in the poor structural conditions at the root of the aforementioned structural dualism.

To contrast this trend, governments should undertake appropriate economic policies, consisting in the abolition, through deregulation, of barriers and protectionist constraints and inducing structural changes fostering investments in infrastructure, in education and in research and development. In such a way the exposure to international competition might act as a powerful stimulus for the productivity and hence competitiveness of Italy.

Until today Italian governments always insisted on short term and anti cyclical policies, with the exception of some experiments of economic planning in the 1950s and 1960s without positive impact. Policies chiefly sought to compensate situations of economic delay rather than eliminate the determining factors. Most investments were carried out either directly or indirectly, through a system of incentives, by the government, on the basis of criteria often disrespectful towards market forces.

Recent years witnessed an increase of the expenditure in R&D, improvements in education, vocational training and infrastructures, and the establishment of antitrust rules and institutions, as a consequence and in view of the growing European integration. However,

---

[10] In Italy the expenditure in R&D in 1993 was about 2/3 of the average expenditure of the main industrialised countries.

[11] It has to be underlined that the negative correlation of market opening and unit labor product in the sheltered sectors could be due to the lack of consistence of the regression's coefficient. According to the model in fact there should not be any relationship between market opening and unit labor product in the sheltered sectors This problem will be object of further investigation

intervention in these fields is not enough to improve or just keep the competitiveness of the Italian economy relative to the other industrialised countries.

In conclusion, in the light of the results of the present research and of the growing trend towards globalisation[12], Italian governments should support a "virtuous circle" of technical innovation and internationalisation . This could happen by lowering institutional barriers and protectionist ties especially in sectors where high-skilled, high-tech goods and services are produced. Italian enterprises would then be able to compete successfully in the global market.

---

[12]World Bank Book, 1996.

APPENDIX I

Tab.1

LEVELS OF UNIT LABOUR PRODUCT
(ULP thousand US $, prices 1985, exchange rates 1987)

YEARS	ITALY	USA	GERMANY	JAPAN	G7
1980	26.45	35.49	36.86	33.31	32.53
1985	27.66	37.48	38.31	38.15	35.33
1993	32.52	40	44.62	44.63	39.7

Source: OCSE, EUROSTAT, ISTAT

Tab.2

LEVELS OF UNIT LABOUR PRODUCT IN EU COUNTRIES
(ULP, thousand US $, prices 1985, exchange rates 1987)

	1980	1985	1993	RANK
IRELAND	37.95	44.32	59.14	1
GERMANY	36.86	38.31	44.61	2
FRANCE	33.18	36.46	42.57	3
BELGIUM	32.60	35.22	40.13	4
DENMARK	32.29	35.51	39.41	5
NETHERLAND	34.52	37.30	38.56	6
LUXEBOURG	30.85	34.30	35.83	7
ITALY	26.45	27.66	32.52	8
G.B.	20.94	23.68	27.13	9
SPAIN	17.95	21.02	24.54	10
GREECE	9.49	9.49	10.44	11
PORTUGAL	6.05	6.16	7.53	12
EU	27.53	29.77	34.46	

Source: OCSE, EUROSTAT, ISTAT

Tab.3

AVERAGE INCREASE (%) IN THE EXPOSED SECTORS

AVERAGE INCREASE	REAL PRODUCT (for employee)	PRICES	REAL WAGES
1970/1980	4.64	11.02	2.91
1980/1985	4.76	11.78	1.25
1985/1993	3.58	3.87	1.81

Source: ISTAT

Tab.4

AVERAGE INCREASE (%) IN THE SHELTERED SECTORS

AVERAGE INCREASE	REAL PRODUCT (for employee)	PRICES	REAL WAGES
1970/1980	1.94	14,61	2.,60
1980/1985	0.28	14,92	1.03
1985/1993	1.03	6,60	1.72

Source:ISTAT

APPENDIX II

AUGMENTED DICKEY FUELLER: UROOT (T,1) **ln ULP**
                                                  D-F t-stat = -4.0528
MacKinnon critical values: 1% =-4.9893
                                                  5% = -3.8730
                                                  10% = -3.3820

AUGMENTED DICKEY FUELLER: UROOT (T,1) **ln ULPp**
                                                  D-F t-stat = -3.3519
MacKinnon critical values: 1% =-4.9893
                                                  5% = -3.8730
                                                  10% = -3.3820

AUGMENTED DICKEY FUELLER: UROOT (C,1) **ln ULPe**
                                                  D-F t-stat = -3.5117
MacKinnon critical values: 1% =-4.8025
                                                  5% = -3.7921
                                                  10% = -3.3393

AUGMENTED DICKEY FUELLER: UROOT (C,0) **ln R&D**
                                                  D-F t-stat = -2.7530

MacKinnon critical values: 1% =-4.1366
                                                  5% = -3.1483
                                                  10% = -2.7180

AUGMENTED DICKEY FUELLER: UROOT (T,1) **ln MO**
                                                  D-F t-stat = -3.8636

MacKinnon critical values: 1% =-4.9893
                                                  5% = -3.8730
                                                  10% = -3.3820

_____

References

Archibugi D., Ceccagnoli M., Palma D., (1996) "Tecnologia e Competitività Industriale: il Caso Italiano", (Technology and International Competitiveness: the Italian Case), *Quaderni di Politica Industriale* n.8, Mediocredito Centrale, April.

Barro R.J., (1991), "Economic Growth in a Cross-section of Countries", *Quarterly Journal of Economics*, n.2, pp.407-44.

De Santis R., (1999) **"**Integrazione Economica, Competitività e Produttività: una Verifica Empirica per l'Italia", gennaio, *Rivista di Politica Economica*, Roma

Hickman B.G., (1992) "*International Productivity and Competitiveness*", Oxford University Press.

North D.C., (1994), "*Institution, Institutional Change and Economic, Performance*", Il Mulino, Bologna.

Grossman G.M., Helpman E., (1991),"*Innovation and Growth in the Global Economy*", Cambridge (MA), MIT Press,.

Lucas R.E., (1988), "On the Mechanism of Economic Development", in *Journal of Monetary Economics*, July, pp. 3-42.

Krugman P., (1990), "A Technology Gap Model of International Trade", in *Rethinking International Trade*, MIT Press, Cambridge Mass.

Krugman P., (1996), "*Strategic Trade Policy and the New International Economics*", MIT Press.

Pugno M., Segnana M.L, (a cura di), (1992), "*Commercio Internazionale e Crescita Economica*", (International Trade and Economic Growth), Nuova Italia Scientifica.

Riviera Batiz L.A., Romer P.M., (1991), "International Trade with Endogenous Technological Change", *European Economic review*, n.4, pp.971-1001.

Romer P.M., (1986), "Increasing Returns and Long-Run Growth", *in Journal of Political Economy*, October, pp. 1002-37

Romer P.M.,(1990), "Endogeneous Technological Change", *Journal of Political Economy*, vol.98, n.5

Savona P., (1993), "Sviluppo, Profitti e Finanza in Italia", (Development, Profits and Finance in Italy), in *Sviluppo Economico*, Vol.I, n.1.

Savona P., Jean C., (1995), " *Geoeconomia*", (Geoeconomics), Franco Angeli, Milan.

Scandizzo P.L., Milana C., (1991), "The Price of Oil and its Impact on the Italian Economy. A General Equilibrium Analysis", in *Rassegna Economica*, pp.209-260.

Solow R. M., (1992), "*Lessons on Endogeneous Growth Theory*", Nuova Italia Scientifica,.

World Bank Book, (1996), "Global Economic Prospects and the Developing Countries", Washington D.C.,.