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UNDER TERTIARISATION AND UNEMPLOYMENT

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SOTTO-TERZIARIZZAZIONE E DISOCCUPAZIONE

Riassunto

Il tasso di occupazione nei 15 paesi dell'EU negli ultimi due decenni, com'è noto, è molto più basso rispetto a quello degli Stati Uniti. Meno noto, forse, è che questa differenza è tutta ascrivibile al tasso di occupazione nei servizi, mentre quello dell'industria (e dell'agricoltura) ci è favorevole. Non solo, ma tra i servizi il tasso di occupazione di quelli finali è rimasto stazionario, mentre soltanto i servizi intermedi hanno mostrato una buona dinamica. Sembra dunque che buona parte dei servizi non sia stata in grado di interagire con gli altri settori, e in particolare con la manifattura che maggiormente è stata interessata al progresso tecnico, al fine di assorbire occupazione, creare reddito e fornire domanda.

La dimensione di questi fatti è stata messa a fuoco solo di recente, ma lo studio delle cause e dei rimedi è ancora in una fase arretrata.

Proposito di questo paper è quello di fornire un modello in grado di spiegare, in modo interconnesso, i fenomeni della sotto-terziarizzazione e della disoccupazione. Il modello è a due settori, i quali sono diversi per le tecniche adottate, uno con tecniche migliori dell'altro, mentre la loro dimensione relativa è determinata endogenamente. La presenza di rigidità nei salari permette di ottenere una disoccupazione che è influenzata dalla composizione settoriale. Inoltre, le imprese sono ipotizzate come eterogenee, e questo permette di studiare come la dimensione di ciascun settore sia dovuta al numero delle imprese piuttosto che alla loro dimensione. E' così possibile studiare anche il fenomeno della grande dispersione del settore distributivo italiano.

Tra le cause che deprimono il terziario e l'occupazione sono state prese in considerazione anzitutto un insieme di provvedimenti volti a proteggere il mercato dei servizi, e che sono invece risultati distorsivi. In secondo luogo, è stata studiata una possibile interazione fra tasso di occupazione, domanda e offerta di beni e servizi, tale per cui vengono determinate due posizioni di equilibrio, uno "basso" ed uno "alto". In tal modo potrebbero essere rappresentati i casi dell'Europa e degli Stati Uniti.

JEL Classification: E24, J23

0. Introduction

The data on employment in Europe stand in sharp contrast with those in the US, not only, as is well-known, because the employment rate is lower, but also because employment in the service sector is relatively very much lower. This suggests that the problem of unemployment in Europe necessarily involves the problem of under-tertiarisation. In particular, employment in consumer services are expected to be still very sluggish in Europe, if the past trend is considered, while producer services exhibit a more dynamic and promising performance.

These facts have been recently recognised by the literature (Anxo and Storrie 2000; European Commission 1999a; McKinsey Global Institution 1994; Freeman and Schettkat 2000; Elfring 1989; Borzaga, Demozzi and Povinelli 1999). However, under-tertiarisation in Europe is not studied very much, if compared to unemployment in Europe generally, maybe because the rigidities in the labour market have focused the attention of the debate. By contrast, when the tertiary sector is studied, the rigidities in the product market, and especially the excessive regulations in the continental European market, are immediately recognised as detrimental for the sector and for the economy as whole (Sapir, Buigues and Jacquemin 1993; OECD 1991; Koefijk and Kremers 1996; Pilat 1996). In some cases, indeed, regulations and public monopolies are designed to protect employment, as if the roles of absorbing unemployment and promoting growth were distinctly assigned to services and to manufacturing respectively (Barca and Visco 1992)¹. A

¹ Koefijk and Kremers (1996) complain of the scarcity of studies, with respect to the US, regarding the economic costs of regulation in Europe. Even scarcer, however, are the studies on consumer services which are highly regulated: retail trade and particular

second reason behind under-tertiarisation in Europe, though excluding the Scandinavian countries, has been identified: the low participation of women in the labour market which induces a low externalisation of household services (Bettio e Villa 1998; Esping-Andersen 1999). Unfortunately, both in the case of rigidities in the market of services and in this case the analysis has been mainly remained at the empirical level².

This paper thus proposes a model to explain under-tertiarisation in consumer services and unemployment by focusing on specific rigidities in the market of services. In fact, it intends to capture the following administrative measures: a legal barrier to entry into the service sector, a legal barrier to large service firms, a fixed cost for establishing a new business, a restraint over service product qualities. To this aim the model is somewhat elaborated by assuming heterogeneous ability of the entrepreneurs, which allows us to analyse both the heterogeneous sizes and the numbers of firms of the two sectors, manufacturing and services. Hence, changes in the productive structure of the economy imply changes in the demand for labour, and, since wages are assumed as not flexible, in unemployment. Finally, an attempt at endogenising the propensity to spend into service products is proposed by addressing to the role of women in the markets. This analysis will bring us to the case of two equilibria, one of low employment and a small service sector (under-tertiarisation), which is typical of Europe, and the other at a higher position, which is typical of the US.

classes like pharmacies, professional activities like notaries, road transports like taxis, social services like childcare and elderly care.

² Brunello and Scaramozzino (1994), who propose a two-sector model with imperfect competition in the product market and with union's bargaining in the labour market, is an exception.

The paper is organised as follows: section 1 provides some evidence for the relevant facts to be explained; section 2 provides the benchmark model with no rigidities in the product market; section 3 introduces examples of policies protective of services, and studies their consequences; section 4 attempts to capture the role of women in the labour market. The conclusions and the mathematical appendix end the paper.

1. The US-EU gap in tertiarisation and employment

Recent data show that the US economy employs, in proportion, about one fourth more than does the European economy. More precisely, in 1997 the employment rate in the US was 74%, while in Europe it was 60.5% if the 15 EU members are considered, but in the case of continental EU members it was 58.7 (Tab.1)³. More than one third of this last gap was due to the sectors of Distributive trades (D) and Hotels and restaurants (HR), which are largely oriented to final consumption. A further 0.7 point of difference, i.e. almost 1.5 million jobs, is due to Recreational and other personal services (R). As is well-known, the public sector in the US is smaller than in Europe, since several functions are privatised. However, on the whole, Public administration, education, health and social works (P) is a larger sector in the US, by 3.4 points.

===== Tab.1 about here =====

These gaps can hardly be explained by the higher per capita GDP of the US. Citing the Engel law is not sufficient justification, since its prediction is on the composition, rather than on the overall level of employment (see

³ This gap is not a statistical artefact, at least for the Germany-US gap, as Freeman and Schettkat (2000) have shown after a close scrutiny of a special database which make comparable German and US employment data at a very fine level of disaggregation.

also European Commission 1999a). Moreover, under-tertiarisation is expected to widen if the recent trends are considered. In fact, the continental EU members have employed from 1985 to 1997 only 0.1 points more in the D plus HR sector, and 1.6 points more in the R plus P sector, whereas the US has employed 1.1 and 4.7 more respectively. The Finance and business service sector has instead grown at 1.9 and 1.5 points respectively in the two areas (European Commission 1999b:16).

These differences in the employment rates between Europe and the US seem ironic if one bears in mind that in several European countries policy measures were implemented precisely in order to protect employment. The most notable example is the restriction on establishing large stores in various countries, and especially in Italy. In fact, 83.5% of employment in Retail trade and repair services for Italy in 1995 was in micro-enterprises with fewer than 9 employees; followed by 75.3% for Spain, while the average for EU-15 was 54.2%, and the figure for the UK was 27% (Eurostat 1998:46)⁴.

Participation by women in the labour market is important to raise employment, and to expand the service sector. In fact, in those countries where employment rates are relatively high, the contribution of female employment rates are also relatively high. More precisely, the correlation between the two across EU-15 in 1997 is 0.94. It is interesting to note that for these recent data the correlation also indicates that a 1 point rise in the total employment rate implies an increase of 1.3 points in the female employment rate. This means that the male labour market tends to become

⁴ Ergas (1995) has found that the density of retail outlets in Italy and in Japan is double that required by population density and distribution across the territory, and by their ability to move, having considered the 4 biggest European countries, the US and Japan as the sample for the regression and for the simulation. Analogous conclusions are in OECD (1992) and Pellegrini (1993).

saturated before the female labour market does. Inspection of individual sectors shows that women are employed most in consumer services: 57.6% of total employment in the R sector for EU-15 in 1995, 52.6% in HR, 76.2 in Health and social works, as against 22.6% in Industry (Eurostat 1998:25).

Female participation in the labour market is also important on the demand side of the services market. Their greater participation implies that more home services are substituted by market services. This fact may justify the positive correlation between the female employment rate and the expenditure share for services by households. This is 0.39 for a sample of 11 EU countries plus the US in 1996-97⁵. This coefficient would be higher if it considered that Denmark and Sweden achieve high female employment rates while many services are provided by the public sector. The outlier position of the US is anyway evident: it achieves 67.5% of the female employment rate and 58.4 of expenditure share in services, while the 11 European countries exhibit, on average, 56.4% and 43.8% respectively⁶. The trend is not

⁵ If the expenditure share does not include transport and communication services, the correlation coefficient is 0.49. Consistent results to these findings are obtained by Illeris (1989), who observes a negative relationship between hours of household and hours paid working in Denmark, and by Esping-Andersen (1999), who finds that married women's employment has a significant effect on employment growth in services in France, Spain and the US.

⁶ Further evidence of the role of female participation in shaping the service sector is provided by a study on the dispersion of distributive trade in 7 major economies, which has found that the female participation rate in the labour force has a statistically significant negative effect, thus capturing the opportunity cost of time spent shopping (Ergas 1995). Also Freeman and Schettkat (2000) regard the substitution in household production as important in explaining the US-German gap in employment and tertiarisation.

encouraging, since the US-EU gap in the expenditure share for services widened between 1970 and 1995 (Eurostat 1998:14).

2. The benchmark model

The model proposed is essentially short-run, but it is designed to study structural features. It belongs to the category of models of heterogeneous talent (Murphy, Shleifer and Vishny 1991; Rauch 1991), where the role of entrepreneurship is central, while the role of capital is left aside. Various aspects of the model could be elaborated further, but interesting results still emerge from this simple version.

In this section, the model will be free of any rigidity in the product market of services, and with an exogenous propensity to spend on services. This is the benchmark, while the next sections will consider some variants of it.

2.1 *The distribution function of ability*

Let us begin with the less usual assumptions, i.e. that the individuals in the economy belong to the set of real numbers, that they are endowed with a heterogeneous entrepreneurial ability in production over the relevant period, and that they can be thus ranked smoothly and continuously. Formally this can be represented by a cumulated function as follows:

$$[1] \quad A = A(E) \quad \text{with } 0 < E \leq N$$

where $N \in \mathbb{R}^+$ indicates the (exogenous) number of individuals in the economy, as ranked in descending order of ability, E is the number of those individuals who have chosen to become entrepreneurs, A is the cumulated ability of the first E individuals, who are thus also the ablest. The properties of equation [1] are: $\lim_{E \rightarrow 0^+} A(E) = 0$, $0 < A(N) < +\infty$, $1 < \lim_{E \rightarrow 0^+} A' \equiv a < +\infty$,

$A'(N)=1$, $A''<0$. Hence, $A'(E)$ represents the ability of each individual as a function of the number of the ablest individuals. For the solution of the model with a distribution function of the Paretian type see the Appendix.

2.2 Production functions

The economy produces two goods, a manufacturing good (m) and a service good (s), according to the following microeconomic production functions:

$$[2] \quad y_m = T A' [l_m e(w_m)]^a \quad \text{with } 0 < b < a < 1$$

$$[3] \quad y_s = Q A' [l_s]^b \quad \text{with } 0 < Q < T < +\infty$$

where y indicates output, T and Q are specific exogenous indices of efficiency, l is labour employed. The ability of each entrepreneur (A') characterises the efficiency of his firm (cf. Lucas 1978), and is generic with respect to the sector employed. The efficiency of labour is equal to 1 in the service sector, while it varies with wages in manufacturing according to the usual S-shaped function of the efficiency-wage literature (Solow 1979), and in particular with the property that $e > 1$ at $e'' = 0$, so that maximised efficiency will be larger than 1.

Therefore, service firms differ from manufacturing firms because of more decreasing returns, which is crucial for the following analysis, lower production efficiency, and a lower (maximised) labour efficiency⁷.

⁷ Detailed empirical studies on these gaps between manufacturing and services are lacking. One of the most interesting is Pellegrini (1993), who concludes that the gap in total factor productivity in the UK is more significant for distribution, hotels and restaurants, than for transport and communications.

2.3 Firms' equilibrium

Let us assume that entrepreneurs can earn all the residual from proceeds after paying the labour cost, so that their profits can be called quasi-rents.

Let us maximise these expected profits (π) for manufacturing firms:

$$[4] \quad \max_{w_m, l_m} \pi_m \quad \text{where} \quad \pi_m = y_m - l_m w_m$$

and where output has unitary prices ($p_m=1$).

From the usual first-order conditions one obtains the equilibrium values for effort and for wages. In fact:

$$[5] \quad \frac{e_m(w_m^*)}{e_m'(w_m^*)} = w_m^*$$

which yields the equilibrium values w_m^* and e^* . Firms' demand for labour can thus be derived:

$$[6] \quad l_m^* = \left[\frac{[T e^{*a} a A'(E)]^{\frac{1}{1-a}}}{w_m^*} \right]$$

Let us maximise the expected profits of the service firms:

$$[7] \quad \max_{l_s} \pi_s \quad \text{where} \quad \pi_s = p_s y_s - l_s w_s$$

where, note, price (p_s) is exogenous to firms. Let us also assume that wages are fixed exogenously at some low level, i.e.:

$$[8] \quad w_s = \bar{w}_s < w_m^*.$$

This can be justified by a very abundant supply of labour, so that wages can reach a minimum level of reservation.

Firm's demand for labour can thus be derived:

$$[9] \quad l_s^* = \left[\frac{[p_s \bar{w}_s^b b A'(E)]^{\frac{1}{1-b}}}{\bar{w}_s} \right]$$

Since both l_m^* and l_s^* are declining functions in E , i.e. $l_i^{*'}(E) < 0$, it follows that the less able individuals are, the smaller the size of firms that

they are able to manage. In particular, manufacturing firms have a larger size than service firms if $l_m^* > l_s^*$. This condition can be written from equations [7] and [9] as follows:

$$[10] \quad A'(E) > \left[\frac{p_s \bar{E} b}{\bar{w}_s} \right]^{\frac{1-a}{a-b}} \bigg/ \left[\frac{T e^{*a} a}{w_m^*} \right]^{\frac{1-b}{a-b}} \equiv c.$$

Hence, the (monotonically) declining curve representing the distribution function $A'(E)$ can be divided by an horizontal line (c) into an upper part, where manufacturing firms are larger than the service firms, and a lower part, where the reverse is the case.

2.4 The equilibrium profits of the two sectors

An individual can choose to become entrepreneur in one of the two sectors according to the maximum of the two expected profits (π_m^* , π_s^*), given that:

$$[11] \quad \pi_m^*(E) = T A'(E) [l_m^*(E) e^*]^a - w_m^* l_m^*(E)$$

$$[12] \quad \pi_s^*(E) = p_s Q A'(E) [l_s^*(E)]^b - \bar{w}_s l_s^*(E)$$

and that the maximum profits are greater than wages, as specified below.

Manufacturing firms earn more or equal profits with respect to service firms if $\pi_m^* \geq \pi_s^*$. This condition can be written as follows, after substituting equations [7] and [9] into equations [11] and [12] respectively, and by using the definition in [10]:

$$[13] \quad A'(E) > c \left[\frac{\bar{w}_s (1-b)/b}{w_m^* (1-a)/a} \right]^{\frac{(1-a)(1-b)}{a-b}} \equiv b.$$

Let us represent this condition as in Fig.1. The curve of the ability distribution intersects once with the horizontal line b , where the least able individual of the E_m^* group is indifferent to becoming entrepreneur in one of the two sectors. But for $A' > b$, the ablest individuals in the E_m^* group would choose manufacturing, since $\pi_m^* > \pi_s^*$, while the individuals who are

immediately less able would choose to become entrepreneurs in the service sector. Hence, all entrepreneurs would have made the best choice once E_m^* had been identified.

===== Fig.1 about here =====

In order to capture the fact that manufacturing firms are generally larger than service firms, except for some public utilities which more closely resemble manufacturing corporations, the following condition must hold:

$$[14] \quad \frac{w_m^*}{\bar{w}_s} \leq \frac{(1-b)/b}{(1-a)/a}$$

so that $c \leq b$ (see Fig.1). This is not a severe restriction, since a small difference in the technological parameters like $a=0.5$ and $b=0.4$ allows manufacturing wages to be no more than 50% higher than service wages, until the other extreme case of equal wages. Therefore, the individuals who are so able as to find it convenient to become entrepreneurs in manufacturing, also run larger firms than they would if they chose to run service firms.

The number of entrepreneurs in manufacturing (E_m^*) varies with changes in p_s . The greater p_s , the higher b (and c) from [13] (and [10]), the lower E_m^* . This is evident from Fig.1, but also from Fig.2, which represents the two equations [11] and [12] of equilibrium profits. The higher p_s the higher π_s^* , the lower E_m^* (see the Appendix for proof). Hence, we can write:

$$[15] \quad E_m^* = E_m^*(p_s) \quad \text{with} \quad E_m^{*'} < 0.$$

This is true, however, for an appropriate range of p_s . Intuitively, a too high p_s tends to crowd out the manufacturing sector altogether, while a too low p_s tends to crowd out the service sector. To be more precise, we must also consider the constraints in the labour market, as analysed in the section 2.5.

===== Fig.2 about here =====

Determining the number of entrepreneurs in the service sector requires the equality condition between expected profits by the least able individual

who would choose entrepreneurship and his opportunity cost of being an employee in manufacturing:

$$[16] \quad \pi_s^*(E) = w_m^*.$$

This can be justified by the possibility for manufacturing firms to select workers, and hence to select the ablest individuals. Therefore, condition [16] gives the total number of entrepreneurs who earn equilibrium profits (E_T^*), as represented in Fig.2, while entrepreneurs in the service sector is thus simply obtained:

$$[17] \quad E_s^* = E_T^* - E_m^*$$

for an appropriate range of p_s . It is evident from equation [12] and Fig.2 that the higher p_s is, the larger the number of entrepreneurs in the service sector (E_s^*), because this activity becomes more convenient not only w.r.t. manufacturing entrepreneurship (reduction in E_m^*), but also w.r.t. working as employees (expansion of E_T^*). Hence, we can write:

$$[18] \quad E_T^* = E_T^*(p_s) \quad \text{with} \quad E_T^{*'} > 0.$$

2.5 The labour market

Labour demand for workers in the two sectors is obtained by aggregating labour demand by individual firms, i.e.:

$$[19] \quad L_m^* = \int_0^{E_m^*} l_m^*(n) dn \equiv L_m^*(E_m^*) \quad \text{with} \quad L_{m1}^* > 0$$

$$[20] \quad L_s^* = \int_{E_m^*}^{E_T^*} l_s^*(n) dn \equiv L_s^*(E_m^*, E_T^*) \quad \text{with} \quad L_{s1}^* < 0,$$

$$L_{s2}^* > 0.$$

Aggregate labour demand depends on the number of active firms with fixed wages. Labour supply (N) is not binding if it is sufficiently great at ongoing wages, i.e.:

$$[21] \quad N > E_m^* + E_s^* + L_m^* + L_s^*.$$

By combining equations [15] and [19], and [18] and [20], we can write:

$$[22] \quad L_m^* = L_m(p_s) \quad \text{with} \quad L_m' < 0$$

$$[23] \quad L_s^* = L_s(p_s) \quad \text{with} \quad L_s' > 0.$$

A rise in p_s makes service activity more convenient both because it improves the service/manufacturing terms of trade, and because the optimum firm's size grows. This increases the number of service firms on both sides of the spectrum by raising L_T^* and by reducing L_m^* . The latter effect is obviously detrimental to the manufacturing sector. The effect of p_s on total employment is positive if the induced change in E_m^* does not excessively reduce manufacturing with respect to the gain in the service sector. A sufficient condition for this result is that at E_m^* the two kinds of firms are of equal size, i.e. that the smallest manufacturing firm is equal to the largest service firm. This requires the sign of equality in condition [14]. Otherwise, in the case of $w_m^* = \bar{w}_s$, the technological difference between the two sectors must not be too large (see the Appendix). From these observations on the parameters, it is reasonable to expect that a rise in service price will induce a rise in total employment.

We are now in a position to be more precise about the bounds on the size of the two sectors for different prices p_s . A rise in p_s expands service and total employment and reduces manufacturing employment, until, for a certain level labelled \bar{p}_s , E_m^* and hence L_m^* become zero. This is true if labour supply is not binding, as would be seen in Fig.1 if b were brought up to the a level for a sufficiently high p_s . In this case, only the service sector would survive. If labour supply were binding, then it could fix E_m^* at some level for some appropriate level for $p_s < \bar{p}_s$, but this case will no longer be considered here. Conversely, below a sufficiently low level of p_s , labelled as \underline{p}_s , service firms are not convenient to anybody, thus making $E_m^* = E_T^*$ (as

could be seen in the Fig.2 if π_s^* were sufficiently lowered)⁸. In this case total employment is at the minimum.

2.6 The relative supply curve of services

Having determined the sizes of the two sectors in terms of the number of firms on the basis of equilibrium profits, we can obtain the sizes in terms of output, and define the relative supply curve of services.

Output in the two sectors is given by aggregating the output of individual firms, i.e.:

$$[24] \quad Y_m^* = \int_0^{E_m^*} TA'(n)[l_m^*(n)e^*]^a dn$$

$$[25] \quad Y_s^* = \int_{E_m^*}^{E_T^*} EA'(n)[l_s^*(n)]^b dn .$$

The relative output of services is thus:

$$[26] \quad \frac{Y_s^*}{Y_m^*} = \frac{\left[\frac{p_s^b b^b \bar{E}}{\bar{w}_s} \right]^{\frac{1}{1-b}} \int_{E_m^*(p_s)}^{E_T^*(p_s)} A'(n)^{\frac{1}{1-b}} dn}{\left[\frac{a^a T e^{*a}}{w_m^*} \right]^{\frac{1}{1-a}} \int_0^{E_m^*(p_s)} A'(n)^{\frac{1}{1-a}} dn}$$

having substituted equations [7] and [9], and [15] and [18] into [24] and [25]. This can be called the relative supply curve of services, because it relates service price to the relative output of services. As can be easily seen, service price positively affects the supply of services through two channels: by expanding the size of service firms (the first term on the r.h.s.), and by increasing their number drawing on manufacturing entrepreneurs (reduction in E_m^*) and on workers (increase in E_T^*). The curve can be depicted as in Fig.3.

⁸ Note that at this point the level of b in Fig.1 would be anyway greater than or equal to 1.

===== Fig.3 about here =====

By using equations [19] and [20], it can be obtained from [26] that:

$$[27] \quad \frac{L_s^*}{L_m^*} = \frac{w_m^*}{\bar{w}_s} \frac{p_s \mathbf{b}}{\mathbf{a}} \frac{Y_s^*}{Y_m^*}$$

so that changes in the relative supply of services imply proportional changes in relative employment in the two sectors, for any given price.

A rising supply curve of services may be surprising, since labour is not a scarce resource by equation [21], and firms can freely enter and leave the markets of goods and services. The scarce resource is, in fact, entrepreneurial ability, and it is, moreover, unevenly distributed and indivisible. A rise in the service price extracts that ability from workers and from manufacturing, so that more service output is available.

2.7 Relative demand and equilibrium in the market of services

In order to find equilibrium prices and quantities in the market of services, thus closing the model, we need the demand side.

A simple utility function for the economy's individuals can be assumed, since capital is absent and intertemporal preferences are not necessary. A CES function is in fact assumed⁹:

$$[28] \quad U = \left[I D_s^{-r} + (1 - I) D_m^{-r} \right]^{\frac{1}{r}} \quad \text{with } 0 \leq I \leq 1 \quad \text{and } r > -1.$$

The equilibrium for consumers requires relative prices equal to the marginal rate of substitution, being $Y_m + Y_s p_s \geq D_m + D_s p_s$ the budget constraint, i.e.:

$$[29] \quad p_s = \frac{U'_{D_s}}{U'_{D_m}} = \frac{I}{1 - I} \left[\frac{D_s}{D_m} \right]^{-(1+r)}.$$

⁹ Lucas (1988) adopts the same assumption in a model without capital.

The elasticity of substitution between demand for services (D_s) and demand for manufacturing products (D_m) is, as usual, $s=1/(1+r)>0$. Since, by definition, the demand elasticities are

$$-\epsilon_m = \frac{dD_m}{D_m} \bigg/ \frac{dp_m}{p_m} \quad \text{and} \quad -\epsilon_s = \frac{dD_s}{D_s} \bigg/ \frac{dp_s}{p_s}, \quad \text{then} \quad s = \frac{d\left(\frac{D_s}{D_m}\right) \bigg/ \frac{D_s}{D_m}}{d\left(\frac{p_m}{p_s}\right) \bigg/ \frac{p_m}{p_s}} = \frac{e_m \frac{dp_m}{p_m} \bigg/ \frac{dp_s}{p_s} - e_s}{\frac{dp_m}{p_m} - 1}.$$

Hence, for constant p_m , then $s=\epsilon_s$. From this condition

and from equation [29] the relative demand for services can be written thus:

$$[30] \quad \frac{D_s}{D_m} = \left[\frac{I}{1-I} \right]^{e_s} p_s^{-e_s}.$$

In Fig.3 this appears as the declining branch of an hyperbole with the axes as asymptotes.

Therefore, the demand curve and the supply curve intersect once, thus yielding, for $\frac{Y_s^*}{Y_m^*} = \frac{D_s^*}{D_m^*}$, the equilibrium relative price and quantity: p_s^* ,

$(Y_s/Y_m)^*$. Having determined p_s^* , equations [7], [9], [11] and [12] can be solved for l_m^* , l_s^* , π_m^* and π_s^* respectively, and hence all the other unknowns.

Note that by considering equation [27], if the relative supply curve lies at a higher position, relative supply and relative employment are proportionally lower if $\epsilon_s=+\infty$, thus p_s remaining constant, and that relative employment rises proportionally to p_s if $\epsilon_s=0$, thus $(Y_s/Y_m)^*$ remaining constant. Let us finally observe that a rise in I or in ϵ_s increases p_s^* , as is evident from Fig.3, and hence, from the discussion in the previous section, not only does service employment increase but total employment rises as

well. An attempt to endogenise I will be made in section 4, while the interesting values for ε_s are around unity or more, as suggested by the literature¹⁰.

3. Does protected services protect service employment?

Since service activity is more sheltered from international competition than manufacturing activity, it has been regulated in domestic markets by various measures and to different degrees. Since services include very different kinds of products, due to both market structure and methods of production, very different protecting measures have been applied. The simple model of the previous section obviously cannot consider them in detail. However, it is possible to capture the essence of these measures by four major examples, which can refer to specific parameters of the model. These are: a legal barrier to entry in the service sector, a legal barrier to large service firms, a fixed cost for establishing a new business, a restraint over service product qualities.

3.1 The case of a legal barrier to entry

A simple and widely used method to protect services is to fix an administrative barrier to entry into the market of service products. Restrictive measures of this kind have been implemented in Italy and France for the distributive trade, and in Italy for professional services and for the urban

¹⁰ Appelbaum and Schettkat (1999) argue for an elastic price elasticity of services, since it is a less saturated market than manufacturing. Hence, together with a large income elasticity for services, as Engel's Law would predict (Fuchs 1968), they are able to explain Baumol's stylised fact of long run constant share of service output (Baumol et al. 1989). Bollino and Rossi (1987) confirm that service prices are elastic for Italy.

transportation of persons (OECD 1991; 1992). One reason cited for these measures is that their purpose is to guarantee some minimum return for the existing activities, so that the claim is that they protect employment. However, the results from our general equilibrium model sharply contrast with this claim.

In order to capture the barrier to entry into the service market with the model at hand, let us assume the following restriction:

$$[31] \quad \tilde{E}_s < E_s^* \quad \text{with } \tilde{E}_s > 0$$

where \tilde{E}_s is the number of service firms, which is fixed exogenously by administrative measures. Let us then label as \tilde{p}_s that particular price which makes the profit curve for services (equation [12]) exactly define $\tilde{E}_s = E_s^*$ ¹¹. Hence, for any given price greater than \tilde{p}_s , the supply of services is smaller and the relative supply curve is at a higher position than that depicted in Fig.3, thus generally raising equilibrium price (p_s^*) and reducing equilibrium relative supply (Y_s/Y_m)^{*}. If the ablest service entrepreneurs are also the ablest to be included in the \tilde{E}_s group, then the higher position of the curve will be due to a $\tilde{E}_T = E_m^* + \tilde{E}_s$ smaller than E_T^* in the equation [26], as depicted in Fig.4. In the case of a constant p_s^* , which may be due to a shift in the demand curve, or to $\varepsilon_s = +\infty$, the service sector shrinks, thus reducing service and total employment, manufacturing remaining unchanged¹². In the case of higher p_s^* , or $\varepsilon_s < +\infty$, and hence higher p_s^* , the \tilde{E}_s group shifts leftward as indicated in Fig.4, so that manufacturing shrinks, and services enlarge firms' size. In particular, if $\varepsilon_s = 1$, then expenditure $p_s^* Y_s^*$ remains constant. This

¹¹ This would be clear by substituting equations [15] and [18] into [17].

¹² This result is also obtained if \tilde{E}_s conversely included the least able service entrepreneurs, and equality in condition [14] prevails.

implies that, in presence of the barrier, service output, service and total employment must be lower¹³.

===== Fig.4 about here =====

This case also allows us to briefly discuss the problem of fixing w_s . The usual case is to assume that w_s is sensitive to the labour market disequilibrium, insofar as it approaches a possible minimum like the reservation wage. However, in this case of a barrier to entry pure rent arises as given by $p_s^*(\tilde{E}_T) - w_m^*$ for every service firm, and w_s can be sensitive to rent sharing by rising, despite excess labour supply. Moreover, if w_s is fixed at a higher level than manufacturing wages, these may tend to rise as well, thus reducing manufacturing output and employment. This is an important analytical result since it shows that the distortions in the product market may call for other distortions in the labour market.

Therefore, the macroeconomic effects on output and employment exerted by the barrier to entry are negative, essentially because higher service prices distort the allocation of entrepreneurship away from the most efficient sector.

3.2 The case of a legal barrier to large firms

Another administrative measure – often combined with the previous one – is that of discouraging large firms in the service sector¹⁴. This measure has been effectively applied in distributive trades in Italy and in France, with the effect of maintaining a very dispersed structure. One reason for this

¹³ Service employment must be lower because, from equation [27], $p_s^*Y_s^*$ is constant, while L_m^*/Y_m^* is lower.

¹⁴ This result also arises if the most recent information technologies, which effectively counteract decreasing returns, are not encouraged to be implemented into the service sector.

restraint is that large firms and improved efficiency would destroy employment because, the argument runs, the higher productivity would push the smallest firms out of the market. This reasoning can be properly checked by the model.

Let us capture the measures against large firms in the service sector by assuming the following restriction:

$$[32] \quad \bar{l}_s \leq l_s^* \quad \text{where } \bar{l}_s \equiv l_s^*(E_m^* + \bar{E}_s) \text{ and } 0 < \bar{E}_s < E_s^*.$$

The profit curve for services thus appears kinked at $(E_m^* + \bar{E}_s)$ as in Fig.5. This reduces service output, thus shifting the relative supply curve upwards. In the case of constant p_s^* (or $\epsilon_s = +\infty$), the service sector shrinks, but the manufacturing sector expands. If the enterprises that pass to manufacturing do not greatly change in size, i.e. condition [14] is read as being of little or no inequality, then also total employment diminishes. A higher equilibrium price raises the convenience of services, and in particular induces the ablest employees to become entrepreneurs of small size firms. In particular, if $\epsilon_s = 1$, the rise in p_s^* is not yet able to enlarge service output to the benchmark level of no barrier, so that manufacturing firms remain more numerous than E_m^* , but it is able to obtain more employment in the service sector than the benchmark level¹⁵. With a larger manufacturing output, equation [27] implies a lower L_s^*/L_m^* .

===== Fig.5 about here =====

Therefore, the legal barrier to large firms has the effect of expanding service employment by raising prices and by activating small units, although it is not able to raise *relative* service employment. The higher prices have the role of maintaining more employment by redistributing real resources from

¹⁵ In fact, at $\epsilon_s = 1$ the manufacturing sector includes less efficient firms, thus lowering Y_m^*/L_m^* , while $p_s^*Y_s^*$ is constant, so that L_s^* is higher, as derived from equation [27].

profits in the manufacturing sector through expenditure on service products to service employment, which are spread over a large number of small units.

If this kind of measure is combined with the previous measure of raising a barrier to entry, then the service price must be even higher, while employment in both services and manufacturing may diminish.

3.3 The case of fixed costs of establishing a new business

Regulations in Europe, and especially in continental Europe, have been recently recognised as significant transaction costs over production. In particular, regulations on establishing new businesses are particularly restrictive in Germany, the Netherlands, Belgium, followed by France, Italy, Denmark and Greece (Koefijk and Kremers 1996). These measures, and all those measures that bear down proportionally more on small rather than large firms can be captured by a fixed cost over production for each firm, so that profits in both sectors must be reduced by a fixed amount. The two profits curves in Fig.2 will thus lie in a downward position, with the effect of reducing E_T^* , while E_m^* remains the same. Again, the relative supply curve of services will be in an upward position, thus raising prices and reducing services on equilibrium. More precisely, $\varepsilon_s=1$ implies a lower Y_s^* and, since the higher p_s^* makes p_s^* more attractive, a lower Y_m^* , and thus L_m^* . For equation [27] L_s^* is lower, and thus L_T^* .

Therefore, a fixed cost for every firm damages service employment or manufacturing employment more depending on the possibility of its transfer onto service prices.

3.4 The case of restraints of new qualities of services

In various European countries, especially in the Netherlands, Germany, Denmark and Italy, shop opening hours and shop locations are administratively restricted, thus hindering a more flexible service to

consumers. The production of other consumer services in continental Europe are discouraged, if not impeded, by restrictive regulations or monopolistic positions of the public sector, like childcare and care of the elderly.

An overall restraint in the quality of services can be captured by the model simply by assuming a lower level of I in the demand function, i.e. a lower propensity to spend on service goods with respect to manufacturing goods. It is evident what the model predicts in this case: a lower service price, which is however paid for a worse quality, lower employment both in services and in the economy as a whole. If this case is combined with one of the previous cases where the relative supply curve lies at a higher position, the overall effect will be the tendency toward low total employment and service employment, and toward low service quality for the same prices.

4. Endogenising the propensity to spend into services

This section will show how the model can be extended by endogenising one key parameter, I , the propensity to spend into service products. The proposal can be considerably refined, but this sketch is already able to capture a well-known fact which plays an important role in under-tertiarisation on the demand side of the product market, and which can be effectively matched with the aspects on the supply side analysed in the previous section. This fact is the low participation of women in the labour market, which is particularly characteristic of Mediterranean Europe.

Let us recall two related stylised facts. First, as briefly shown in section 1, the relationship between the total employment rate and the female employment rate is not simply close and positive, it is also non-linear. Recently, European countries have experienced an acceleration in the female employment rate, while the US displays a small gap between the two rates.

Hence, the labour market for men, for various reasons¹⁶, becomes saturated before that for women. The secondly, it is usually recognised that, within the traditional division of labour in the family, women work as the best substitutes for marketed services. Hence, it may be expected that for middle-range rates of employment, the contribution of female rates grow increasingly higher, and consequently also the expenditure on consumer services. It might also be expected that, for high rates of employment, the contribution of female rates slow as they approach unity, and, additionally, that the expenditure share in services tends to stop increasing.

Therefore, these facts can be synthesised into an S-shaped relationship as depicted in Fig.6 and specified as follows:

$$[31] \quad I = I(L_T^*/N)$$

with the following properties: $I' > 0$; $I'' > 0$ for $I < I_{flex}$, and $I'' < 0$ for $I > I_{flex}$, being $I(0) < I_{flex} < I(1)$; $I(0) > 0$ and $I(1) < 1$, thus assuming some amount of both goods in the consumption basket for every employment rate.

===== Fig.6 about here =====

From the relative demand for (equation [26]) and relative supply of services (equation [30]), and from the discussion on the positive effects of service prices on total employment in the previous section, one can derive a monotonic positive relationship which links L_T^* to I , i.e.:

$$[32] \quad L_T^* / N = L_T^*(I)$$

¹⁶ On the demand side, firm usually prefer to employ men rather than women, on the supply side, women may prefer to postpone work until after maternity (cf. Rubery *et al.* 1998).

where, for $I \rightarrow 0$ then $L_T^* \rightarrow L_m^*$, and for $I \rightarrow 1$ then $L_T^* \rightarrow L_s^*$ ¹⁷. Fig.6 depicts the possibility of three intersections between the two curves representing equations [31] and [32]. The extreme points of intersection are of stable equilibrium. In fact, a very low starting value of L_T^* , for example, would mean particularly less employment for women, and thus a reduced demand for services. This is however sufficient to stimulate, though at a decreasing rate, more service output, which particularly employs women. An analogous reasoning applies to the other starting values of L_T^* .

It is tempting to interpret the “low” equilibrium as representing the case of continental Europe, and the “high” equilibrium the case of the US. The distortions in entrepreneurship analysed in previous sections 3.1 and 3.3 induce the $L_T^*(I)$ curve in Fig.6 to lie at a higher position, and the restriction in quality of services of section 3.4 induces the $I(L_T^*/N)$ curve to lie at a lower position. Therefore, not only can adequate liberalisation policies in continental Europe increase employment, and the production of services in particular, but they can also trigger a further expansionary process, if these policies make the two curves intersect only at the high position.

5. Conclusions

The literature on the unemployment gap between Europe and the US is huge; yet little attention is paid to the fact that the gap would be substantially reduced if consumer services in Europe were raised by the US proportion. Two reasons account for this European under-tertiarisation: excessive regulation and low externalisation of household services. The model set out

¹⁷ Total working age population may be insufficient, even if completely employed in the service sector, for producing the services required, so that for $L_T^* = L_s^* = N$ then $I(N) < 1$.

in this paper studies how these two explanations work, and how they interact.

There are three key assumptions of the model: heterogeneous entrepreneurial ability, inflexible wages, and more decreasing returns in the service sector with respect to manufacturing. The first assumption allows distinct determination of the equilibrium level of the number and size of firms. The second assumption is useful to allow for equilibrium unemployment, the level of which is affected by the proportion of the two sectors, which is determined by the third assumption.

Excessive regulation in the European countries is distinguished into four examples, which refer to specific parameters or variables of the model. First, the legal barriers to entry into the service sector are captured by fixing the number of service enterprises at a lower level than the equilibrium level. Second, the legal barriers to large service firms are raised by fixing a maximum size for service firms. Third, the costs of establishing a new business are captured by a fixed cost per firm. Fourth, the restraint over service product qualities is captured by a lower propensity to spend on service products. Three out of the four measures have the effect of causing a deterioration in the employment performance of both the service sector and the economy as a whole, if a unitary or elastic service price elasticity is considered. Only the barriers to large firms are able to increase employment by establishing new very small businesses, but at the cost of particularly raising prices. The case of the barriers to entry highlights the problem that the rent arising tempts employees to increase wages, thus hindering the possible adjustment of the labour market through flexible wages. Therefore, an explanation of the US-EU gap in employment can be found in the regulatory rigidities in the market of services even if rigidities in the labour market were the same in the two areas. But the mechanism of rent sharing can also explain a different rigidity in wages.

Another and complementary explanation can be found in the role of female participation in the labour market, which is captured by the model by endogenising the propensity to spend on service products. In fact, if this positively depends on the female employment rate, then it also depends on the total employment rate. This relationship can thus be matched with the reverse one already obtained by the model, which has the employment rate positively depending on the propensity to spend on services. One or more points of equilibrium may arise as intersections between the two relationships. The interesting outcome of two stable equilibria is more likely to arise if the propensity to spend on services positively depends on female employment rates until a point of saturation of the service market has been reached, and if female employment rates contribute, first, to a lagging behind of the total employment rate, when the labour market for men is far from saturation, and then to its acceleration. The outcome of two equilibria is interesting because the equilibrium of low employment and under-tertiarisation can effectively represent the European case, while the other “better” equilibrium can represent the US.

A general policy implication to be drawn from this analysis is that closer attention should be paid to the regulations of the product market of consumer services. Some reduction in these regulations seems advisable, but an incentive for new qualities in services could also be interesting. In the case of distributive trades a high dispersion of units should be discouraged in order to reduce the price level. These measures may fuel the virtuous circle from a higher demand for services to higher supply of services, and thus to women and total employment, and back to higher demand (cf. Boitani and Pellegrini 1997).

Mathematical appendix

Let us assume an explicit cumulated distribution function of ability:

$$[1.A] \quad A = \frac{g_0}{1-g_1} E^{1-g_1} \quad \text{with } 0 < g_0 < +\infty \quad \text{and} \quad 0 < g_1 < 1$$

with derivative as:

$$[2.A] \quad A' = g_0 E^{-g_1}$$

which is a distribution function of the Paretian type. This is a handy and familiar distribution, although some caution is needed in interpreting the ability of the ablest individual.

The condition $l_m^* > l_s^*$ can thus be written:

$$[10.A] \quad E < g_0^{g_1} \left[\frac{Te^{*a} a}{w_m^*} \right]^{\frac{1-b}{g_1(a-b)}} \bigg/ \left[\frac{p_s \dot{E} b}{\bar{w}_s} \right]^{\frac{1-a}{g_1(a-b)}}.$$

The condition $\pi_m^* \geq \pi_s^*$ implies:

$$\frac{Te^{*a} A' l_m^{*a}}{w_m^*} - \frac{p_s^* Q A' l_m^{*b}}{\bar{w}_s} \geq l_m^* - l_s^* \frac{\bar{w}_s}{w_m^*}.$$

Being: $\frac{TA'}{\bar{w}_m} = \frac{l_m^{*1-a}}{a}$, and $\frac{p_s^* QA'}{\bar{w}_s} = \frac{l_s^{*1-b}}{b}$ from equations [7] and [9], then:

$$\frac{l_m^*}{a} - \frac{l_s^*}{b} \frac{\bar{w}_s}{w_m^*} \geq l_m^* - l_s^* \frac{\bar{w}_s}{w_m^*} \quad \text{i.e.} \quad \frac{l_m^*}{l_s^*} \geq \frac{\bar{w}_s (1-b)/b}{w_m^* (1-a)/a}$$

and hence:

$$[13.A] \quad E \leq \left[\frac{\bar{w}_s (1-b)/b}{w_m^* (1-a)/a} \right]^{\frac{(1-a)(1-b)}{g_1(a-b)}} g_0^{g_1} \left[\frac{Te^{*a} a}{w_m^*} \right]^{\frac{1-b}{g_1(a-b)}} \bigg/ \left[\frac{p_s \dot{E} b}{\bar{w}_s} \right]^{\frac{1-a}{g_1(a-b)}}$$

where for the sign of equality, the equilibrium value E_m^* is obtained, and for $E < E_m^*$ manufacturing firms are larger than service firms, while for $E > E_m^*$ service firms are larger than manufacturing firms, though remaining smaller than both kinds of firms with respect to the previous case of $E < E_m^*$. If

$\frac{w_m^*}{\bar{w}_s} < \frac{(1-b)/b}{(1-a)/a}$, the only different result is that, for $E > E_m^*$, condition

[10.A] can be applied, i.e. the ablest entrepreneurs in the service sector run smaller firms than manufacturing sector, though they are preferred because of greater profits.

From [13.A] it can be derived that:

$$[14'.A] \quad \frac{\partial E_m^*}{\partial p_s} = - \frac{1-a}{g_1(a-b)} \frac{E_m^*}{p_s} < 0.$$

The equilibrium condition for E_T (eq.[15]) implies that:

$$[15.A] \quad E_T^* = \left[\frac{g_0 p_s Q b}{\bar{w}_s} \right]^{g_1} \left[\frac{1-b}{b} \frac{\bar{w}_s}{w_m^*} \right]^{g_1 \frac{1-b}{a}}$$

so that it can be derived that:

$$[15'.A] \quad \frac{\partial E_T^*}{\partial p_s} = - \frac{1}{g_1} \frac{E_T^*}{p_s} > 0.$$

Sectoral labour demand can be obtained in explicit forms:

$$[19.A] \quad L_m^* = \left[\frac{g_0 T e^{*a} a}{w_m^*} \right]^{\frac{1}{1-a}} \int_0^{E_m^*} n^{-\frac{g_1}{1-a}} dn$$

$$[20.A] \quad L_s^* = \left[\frac{g_0 p_s Q b}{\bar{w}_s} \right]^{\frac{1}{1-b}} \int_{E_m^*}^{E_T^*} n^{-\frac{g_1}{1-b}} dn$$

so that, for manufacturing sector, it can be derived that:

$$[19'.A] \quad \frac{\partial L_m^*}{\partial E_m^*} = \left[\frac{g_0 T e^{*a} a}{w_m^*} \right]^{\frac{1}{1-a}} E_m^{*-\frac{g_1}{1-a}} = l_m^*(E_m^*) > 0$$

and, for the service sector, that:

$$[20'.A] \quad \frac{\partial L_s^*}{\partial E_m^*} = \left[\frac{g_0 p_s Q b}{\bar{w}_s} \right]^{\frac{1}{1-b}} [-E_m^*]^{-\frac{g_1}{1-b}} = -l_s^*(E_m^*) < 0$$

$$[20''.A] \quad \frac{\partial L_s^*}{\partial E_T^*} = \left[\frac{g_0 p_s Q b}{\bar{w}_s} \right]^{1-b} E_T^*^{-\frac{g_1}{1-b}} = l_s^*(E_T^*) > 0.$$

It is now relevant to study how a change in p_s changes L_T^* , which is the sum of L_s^* and L_m^* . In fact, a rise in p_s displays four effects on L_T^* . It increases the size of service firms, it increases their number by raising E_T^* and by reducing E_m^* , it reduces manufacturing firms by reducing E_m^* . In formulae:

$$\begin{aligned} \frac{\partial L_T^*}{\partial p_s} &= \frac{1}{1-b} \frac{L_s^*}{p_s} + \frac{1}{g_1} \frac{E_T^*}{p_s} l_s^*(E_T^*) \\ &+ \frac{1-a}{g_1(a-b)} \frac{E_m^*}{p_s} [l_s^*(E_m^*) - l_m^*(E_m^*)]. \end{aligned}$$

The first three effects overcome the fourth, if the difference in the last term, which is negative, is not too large, i.e. if $\frac{w_m^*}{\bar{w}_s}$ is close to $\frac{(1-b)/b}{(1-a)/a}$.

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TABLE AND FIGURES

Tab.1 Employment rates in 1997 in Europe and selected EU members, and in the US						
	Employment over working age populaton					
	Total	Of which: Services	Of which: Distributive Trades	Hotels and Restaurants	Public admi. Education Health	Recreational Personal, & Other servic.
Germany	61.8	36.8	8.8	2.0	14.7	3.1
Spain	48.6	29.8	8.1	3.0	8.9	2.9
France	60.1	40.9	8.1	2.0	16.5	3.9
Italy	51.3	31.6	8.6	2.3	11.1	2.4
UK	70.8	50.4	11.0	3.3	17.7	3.7
EU15	60.5	39.2	9.1	2.5	14.7	3.1
Continental EU	58.7	37.2	8.8	2.3	14.2	3.1
US	74.0	54.2	12.1	5.4	17.6	3.8
US-EU15	13.5	15.0	3.0	2.9	2.9	0.7
US-Cont. EU	15.3	17.0	3.5	3.1	3.4	0.7

Source : European Commission (1999b) Employment performance in the member states, Bruxelles, tabb. 1,2,3
Some elaborations

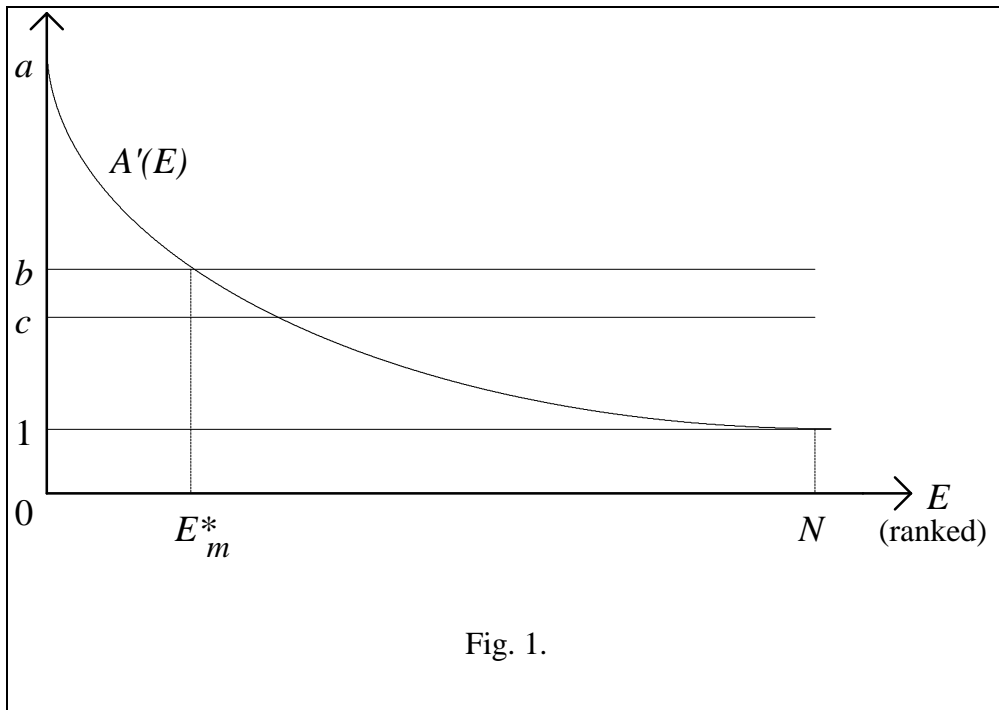
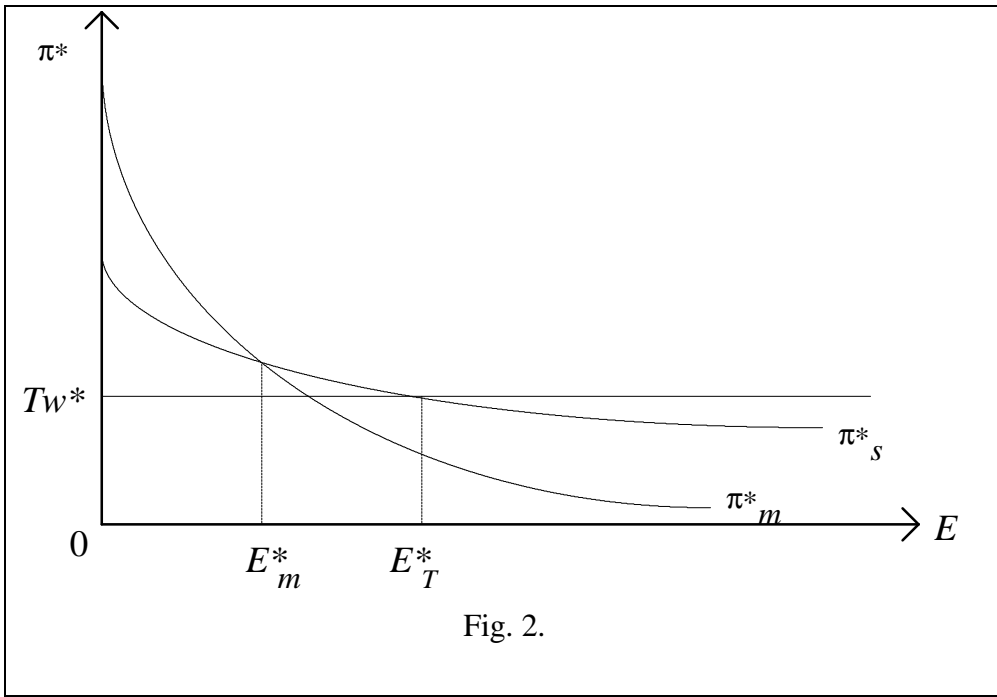
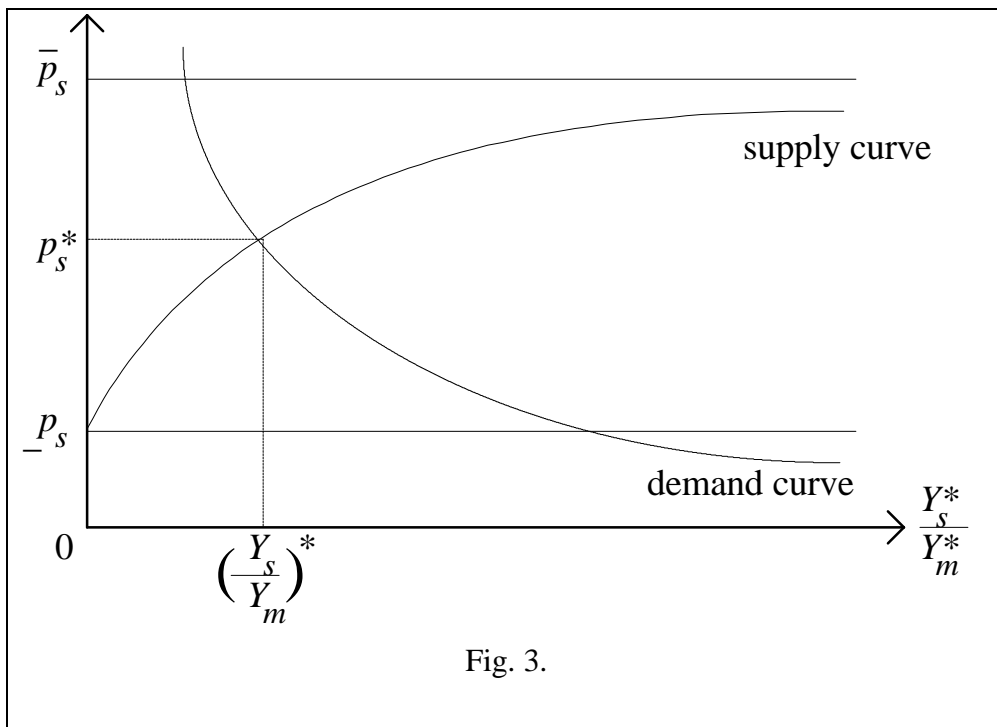


Fig. 1.





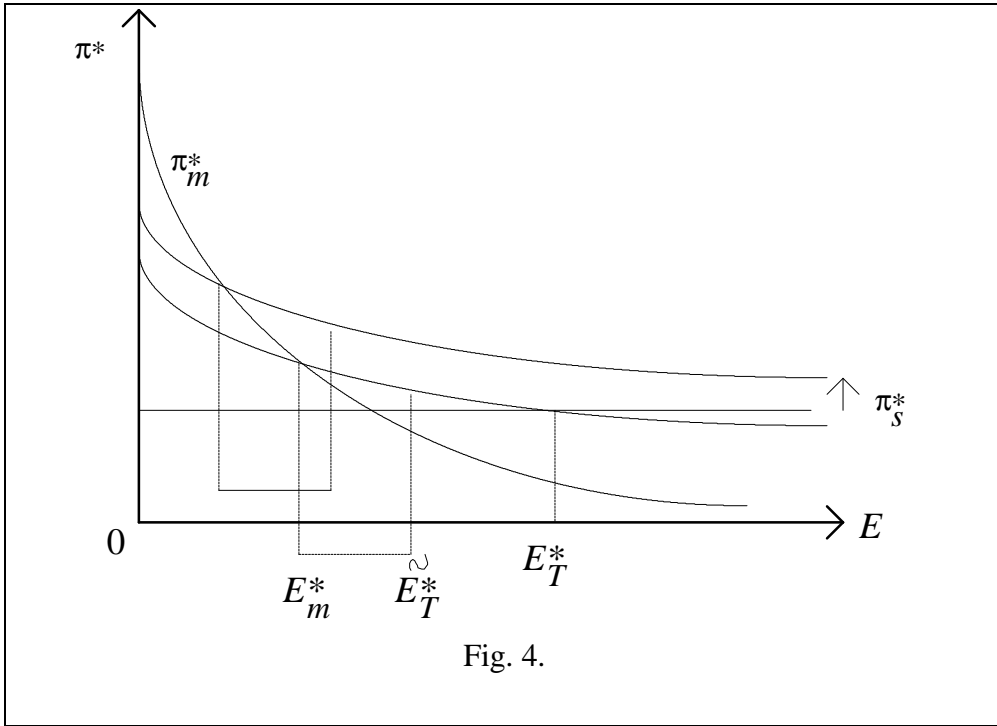


Fig. 4.

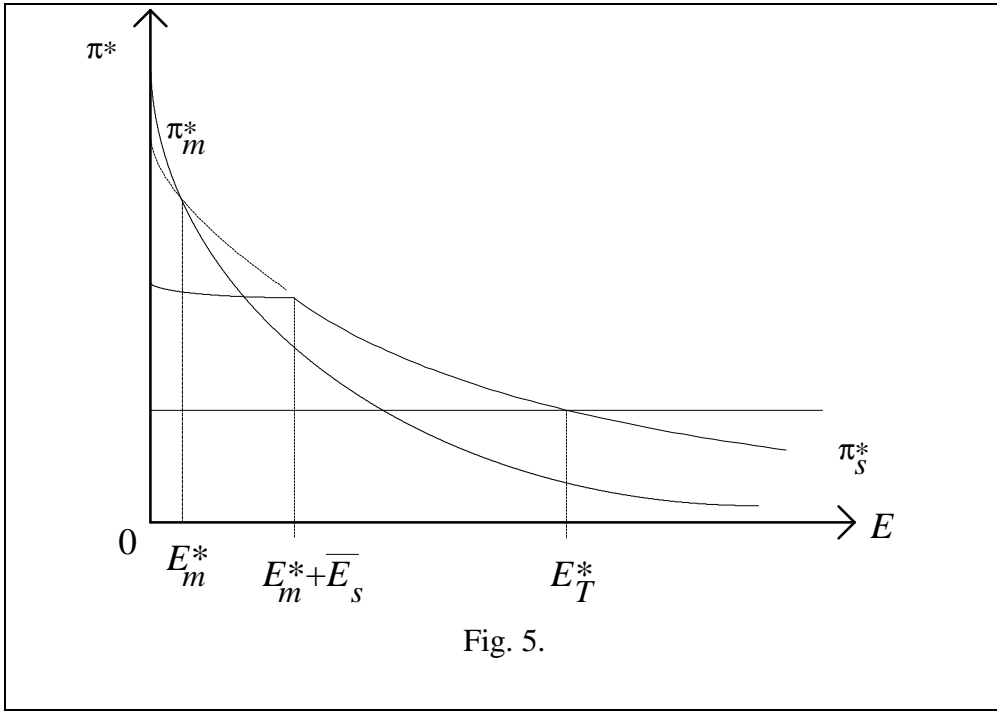


Fig. 5.

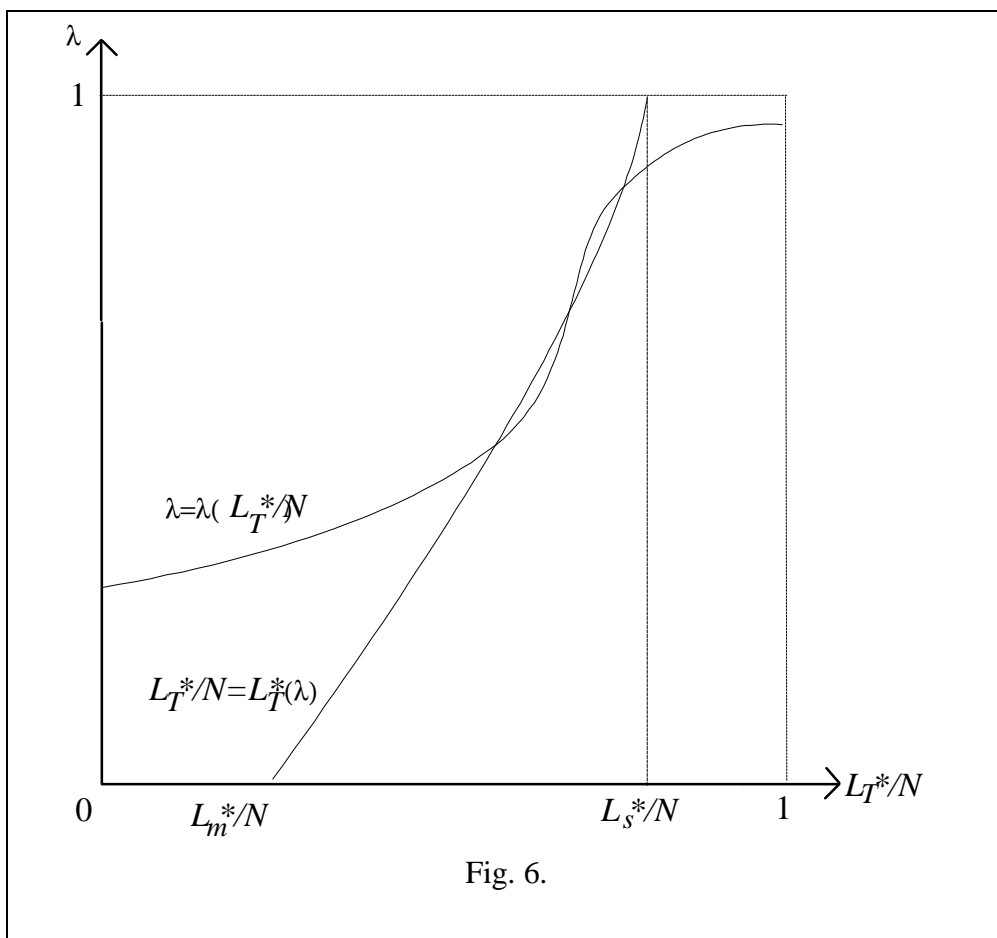


Fig. 6.

Elenco dei papers del Dipartimento di Economia

1989. 1. *Knowledge and Prediction of Economic Behaviour: Towards A Constructivist Approach.* by Roberto Tamborini.
1989. 2. *Export Stabilization and Optimal Currency Baskets: the Case of Latin American Countries.* by Renzo G. Avesani Giampiero M. Gallo and Peter Pauly.
1989. 3. *Quali garanzie per i sottoscrittori di titoli di Stato? Una rilettura del rapporto della Commissione Economica dell'Assemblea Costituente* di Franco Spinelli e Danilo Vismara.
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