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REGIONAL POLICY STRATEGIES FOR SOUTHERN ITALY: A QUANTITATIVE ASSESSMENT OF THE EMPLOYMENT IMPACT

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1. INTRODUCTION

In this paper we model production technologies at the regional level and we analyse the role of institutions as factor of production, in order to assess the employment impact of different regional policy strategies for Southern Italy. Some results of this research permetted an ex-ante assessment of the "*Programma di Sviluppo del Mezzogiorno*" presented by the Italian Government for obtaining the EU Structural Funds 2000-2006 and recently approved by the European Commission (21 billions of Euros).

In Section 2 the main regional gaps are highlighted together with a comparative analysis of the unsatisfactory employment performances of Italian macro-regions.

Section 3 presents a theoretical model of a production function, factor demand functions and econometric results for 4 macro-regions: Northwest, Northeast, Center and South. This is the first complete model of four-region production structure estimated for Italy. We also present some new evidences on the existence of spatial spill-overs among Italian regions. The relevance of such analysis has to be found in the need to understand some structural differences in crucial enterprise behaviour, such as labour demand, of the *Mezzogiorno* region with respect to other Italian regions, in order to produce an assessment of policies strategies differentiated at the regional level.

In Section 4 we analyse the main characteristics and changes of the Italian institutional system during the last three decades, using a comparative approach. The institutions are considered as a particular and complex "factor of production" affecting the production function structure and, especially, the (regular) labour demand.

In Section 5, the results of Sections 3 and 4 are used to produce a quantitative assessment of the employment impact of regional policy strategies (2000-2006), with simulations under different scenarios.

Section 6 contains conclusions and policy suggestions.

2. REGIONAL GAPS AND EMPLOYMENT PERFORMANCE

Let us briefly highlight some important structural differences in the growth and structure of the Italian economy in the last 25 years, in the period 1970-1995[1].

[1] The new data presented here is part of a broader ongoing regional macroeconometric project (Bollino 1994 1995 1996 1998 and 1999), and are described in more detail in Berrettoni et al. (1995) and (1999). Financial data for the period 1970-1992 have been taken from Bollino Magnani (1997) and other real data have been update to 1998 using SVIMEZ (2000). Notice that the official subset of data released by Istat at the regional level is lagging several years with respect to aggregate national data, so that we have used Istat data up to 1995 for consumption, prices, labor income and other available variables and we have estimated a preliminary set of data for 1996, since 1996 data is not complete. Further details about the statistical methodology for regional breakdown can be found in Bollino (1994 and 1998) and are available upon request. The official statistical data for the main economic indicators for the broad

The GDP average growth rate in the period 1970-1995 has been 2.7% for Italy and 2.2% for NW[2], 3.2 for NE, 2.9% for C, and 2.7% for S. The GDP per capita gap between S and CN was steady in the entire period. In 1995, the GDP per capita in S was 65.8% of Italy. The equipment fixed investment average growth rate in the period 1970-1995 has been 3.6% for Italy and 3.7% for NW, 3.9 for NE, 5.2% for C, and 2.0% for S. The final consumption average growth rate in the period 1970-1995 has been 3.0% for Italy and 2.7% for NW, 3.1 for NE, 2.9% for C, and 3.2% for S. The recent preliminary data for the period 1996-1998 (and the 1999 estimation) released by SVIMEZ (2000) confirms that S is lagging behind. On average, the growth rate in the nineties has shown a consistent higher rate in northern regions with respect to the South. Centre and Northern regions GDP has grown at 1.4% average in the period 1992-1998, while S only at 0.4%. As a consequence, the income gap increased further: the Southern GDP as percentage of Center-Northern diminished from 58% in 1992 to 54.6% in 1998.

In 1995, (Table A1 in Appendix) the share of industrial manufacturing activity in GDP (in real terms) has been 25.6% in Italy, but 32.8% in the NW, 29.3% in NE, 21.3% in C; in short: 26.6% in CN and 16.1% in S. Notice that 25 years before, in 1970, the industrial sector was 60% in the CN, but only 10% in the S. Thus, deindustrialization occurred in the N only, while the concurrent industrialization of S was not strong. In fact, the share of industrial activity increased only 5 point in 25 years. This is so despite the fact that the investment/value added ratio has been higher in the S at the beginning of the period: in 1970 this ratio was 12% in CN and 15% in S. In 1995, the ranking is reversed: the ratio is 16.5% in S against 18.2% in CN.

As a consequence of higher investment ratio, notice that capital/output ratio is higher in S. In 1995 it is 6.3 against 5.4 in NW and 4.5 in NE and 4.1 in C. It is interesting to notice that considering only machinery, the capital/output ratio is higher in CN than in S. This has two explanations: a lower share of manufacturing activities and a higher share of public infrastructure investment in S.

Net import/GDP ratio is strikingly different in the two areas: in 1995, it was negative in the CN – 8.9% and positive in S 11.8%. Consequently, in 1995 total savings/GDP ratio was 3% in S and 28% in CN (the Italian average was 22%).

As a consequence of social contributions partial exemptions[3], the cost of labor in the S is lower than in CN (in 1995, it was 82.4% of Italian average, against 102.3% of CN). Given a lower

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geographical areas of Italy: North-west, North-east, Centre, South is not complete. Istat produces only the main aggregate components of NIA variables, while other variables have to be inferred from other sources. For instance, industrial production index and households disposable income and wealth are not available at the regional level.

[2] We adopt the following symbols: NW for North-west, NE for North-east, C for Centre S for South, N for the first two regions combined and CN for the first three regions combined.

[3] These exemptions have been phased out in the following years, according to EC rules.

productivity ratio in S, 81.4% of Italian average against 103.7 in CN, the unit labor cost gap is almost negligible: in 1995, as compared to Italian average, it was 101.3% in the S and 99.7% in CN. It was, however, deteriorating: in 1990 it was 97.8% in S and 100.3% in CN.

It is interesting to notice that worsening of unit labor cost in S between 1990 and 1995 (about 3 points) was due for almost 2 points by productivity worsening and 1 point by labor cost increase. In addition, in the 1996-1999 period the phasing out of labor cost subsidies in the South, as imposed by the UE, resulted in a labor cost differential increase in S with respect to CN.

As savings availability is crucial for investment, let us recall that the analysis of the households savings rate[4] shows that there is a differential of almost 5 percentage points among the North-central regions and the South and almost 10 percentage points among North-west and South. Also the well-known decline in the national savings rate (see Rossi-Visco, 1992, gr.2-4), which occurred since the mid-seventies as a result of the oil shock, has been matched by a decline in the savings rate in the S, resulting in a widening of the gap between South and the rest of Italy, since the mid-eighties. Savings rate peaked in Italy in 1992 at 16%, while NW and C contributed with a rate of 20%, NE with a rate of 14%, and S with a rate of 10%. In 1995, the sharp drop of the national average rate to 8%, resulted form a rate of 10% in CN regions and -4% in S.

In conclusion, these data confirm the historical characteristics of the regional gap among Italian regions, for the higher savings rate in the North is accompanied with a higher concentration of wealth than of income. As far as the wealth income ratio is concerned, we observe notable regional differentials. Given the Italian average around 5.6 in the entire period 1970-1995, this ratio is about 6.1 in NW 5.8 in NE, 5.4 in C and 5.2 in S.

In terms of productive technology requirements (see tables A.1 and A.2), notice that the differences among Italian regions are quite sensible: labor to output ratio is lowest in NW and almost double in S. Energy intensity is highest in NW and C, where heavy industrialization occurred, in the former region due to private efforts whilst in the latter, due to public intervention. Energy intensity is lowest in NE. Overall, energy intensity is declining due to efficiency search efforts. Moreover, import requirements with respect to output is higher and increasing in all three CN regions, reflecting the internationalization of the productive system, which is specialized in transformation and therefore toward exports (9/10 of Italian export stem from CN regions), while it is much lower and roughly constant in the S. The capital/output ratio is highest in the S, considering total capital (machinery and constructions, which includes public infrastructures), but it is higher in the heavy industrialized region (i.e. NW), considering only machinery stock.

As for the employment indicators, in the period 1973-1996, the Italian economic system, compared to the main developed countries, showed an inadequate performance considering the employment rate, the unemployment rate and the net job creation. In Table A2 we compare directly the performances of the 4 Italian macro-regions with 18 countries. As well-known the overall population and employment of many of these countries are lower or similar compared to each Italian macro-regions.

In 1996 the employment rate was 51.3% (against an average of 67.0% in the 19 countries) and the unemployment rate 12.0% (against an average of 8.7% in the 19 countries), while the net job creation in the period 1973-1996 was –3.8 (against an average of +0.6% in the 19 countries). Considering the data distinguished by age classes and sex (table A3), it is interesting to highlight the remarkable dualism (men vs. women) of the Italian employment performance. We can also see that the Italian population from 55 to 64 years is characterised by a low unemployment rate (4.3 in 1996) but also by a very low employment rate (27.3 in 1996). This is an important peculiarity of the Italian employment performance structure compared to most of the countries considered.

Considering the Italian macro-regions, the South showed an extremely low employment rate (40.0% of the working-age population 15-64, in 1996), a high and increasing unemployment rate (from 9.8% of 1977 to 28.6% in 1996) and a remarkable negative net job creation (-9.1 in the period 1977-1996). As for the "irregular" employment, its weight is estimated around 18% in "North-Centre" and 34% in the South[5]. As well-known in North-East we have the higher employment performance. Comparing the performance of the Italian macro-regions with the average of the 19 countries we can highlight that (1) the employment rates are in all regions significantly lower than the above average, (2) the net job creations are remarkable lower with the exception of North-East (that is equal) and (3) the unemployment rate is lower in North-East, similar in North-West, higher in the Centre and extremely higher in the South. Important differences also exist inside of each Italian macro-region (Table A5).

So, the economic and employment indicators presented show that the Italian system is characterised by remarkable and persistent regional differences. In particular, the gap in employment performance of Southern region is remarkable compared to other Italian regions and it is huge compared to the main developed countries.

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[4] Remembering that consumption is defined as economic consumption, i.e. purchases of non durables plus durable services, and disposable income is corrected for inflation and durable services.

[5] See FGB (1998).

3. REGIONAL DIFFERENCES IN PRODUCTION FUNCTIONS

In this section we model production technologies at the regional level in order to produce a quantitative assessment of the past regional policies and to simulate future integrated policy measures. The main focus of our analysis attempts to answer the following questions: is there a risk, without an analysis of the specific characteristics of the productive systems in the Italian regions, that policies for industrial incentives and employment promotion would be ineffective and would induce distortions in resource allocation? How can be successful an economic and industrial policy strategy, differentiated at the regional level, without knowing the structure of capital and labor intensity in the regional production function and the differences in factors productivity at the regional level? Moreover, can the Government set forth policies for the development of employment without knowing the elasticity of substitution between productive factors and, in particular, the elasticity of labor demand function?

With the purpose of highlighting the technology parameter differences across Italian regions, we have estimated a four factors (KLEM) production function, where output is identified as "extended value added", constructed as the sum of value added produced and total imports (of energy and raw materials, as well as other imports of semi-finished and finished products). It is worth noting that this formulation allows an elegant solution of the problem of imports modelling, simultaneously with production decisions, without having to resort to ad hoc specification of import equations.

Notice also that the inclusion of production factors whose relative prices varied considerably through time allows to assess the capability of the regional industrial structure to adapt to exogenous shocks. This issue is particularly relevant for the energy shocks of the 80's and the 1992 devaluation of the Lira.

The crucial characteristics of the model are quite simple: enterprises in the short period are distinguishing between variable factors of production and quasi-fixed factors of production (that are typically not minimizing costs, due to existence of adjustment costs). In this context, the functional characterization of the technology in equilibrium in the short period is given (McFadden 1978) by the restricted profit function or the restricted cost function; the existence of adjustment costs adds realism to the empirical analysis of relevant factor demand elasticities; investment is determined by partial adjustment to desired capital stock. The model is formally presented in Appendix B.

The GL with one fixed factor is parametrized and estimated in Bollino (1999). Operationally, the system is constituted by variable factor demand equations, optimal capital stock and investment equation. It has been applied to industrial sector data of the Italian economy for the

period 1970-1995, distinguished by the four regions: North-west, North-east, Center, South. The data are therefore organized as time series of cross sections data, for a total of 104 observations (4 regions x 26 years).

For the industrial sector three variable factors have been considered (dependent employees and independents, imports of goods excluding energy, imported energy inputs) and a fixed factor of production (fixed capital). We focused on the industrial sector which is the most responsive sector to cyclical fluctuations. For a more detailed data description, see the Appendix B.

Tests of specification and significance of the estimated system are presented in Bollino (1999) and can be summarized as follows. Firstly, regional differences in the technological parameters are statistically significant. This is a new result in the Italian empirical literature, showing that it is possible to assert that the productive structure of Italy is different in the various areas of Italy, not only on the basis of obvious qualitative considerations, but also on the basis of precise quantitative result. Secondly, tests show that there are not signs of wrong dynamic specification and of structural instability (up to three years, at beginning and end of the sample). As far as the significance tests, the estimation results show that the hypothesis of constant returns of scale is refused and that there exists a significant effect of the quasi fixed factor on the cost function. Finally, it is refused the hypothesis of full flexibility of all the productive factors, thus supporting the hypothesis that capital is a quasi-fixed factor, giving meaning to a measure of utilized capacity fluctuations due to the existence of a fixed factor.

The equivalent information in more comprehensible terms of factor demand elasticity are shown in Table A6 (in the Appendix), for selected years. In general, notice that own price elasticities are negative and lower for energy and higher for materials, as expected. Also labor demand elasticities to labor cost are quite well determined, showing inelastic behavior. Output elasticities are generally increasing over time, and are definitely lower than unity for labor and materials throughout the period, but tend to increase above unity for energy at the end of the period. Elasticities of the variable factor demands to the fixed factor the capital stock, are quite different across factors and through time. As far as cross elasticities are concerned, notice some signs of complementarity between labor and energy, and of substitutability between labor and imported materials, not surprisingly.

It is interesting to notice that there are significant differences at regional level: labor own price elasticity is higher in absolute value in NW, around 0.6 – 0.8, while it is around 0.5 – 0.6 in NE and Center and 0.4 in the South. Energy own price elasticity is quite low, as already found in previous empirical studies, it decreases through time and it is lowest, anyway, in the South, with respect to other regions. Notice also that material own price elasticity is clearly inelastic only in

the NW, it is around unity in NE and C, and it is almost double in the South than in the other regions.

Labor elasticities to output are higher in NW and C, around 0.5 while lower in NE and S, around 0.4. It is interesting to notice that these elasticities are quite constant in the Center-north regions, while the are increasing in the South in the 1990's. In fact, in 1995 the output elasticity of labor in the South increases to 0.5, thus converging to the other regions average.

Energy demand response to output is elastic, lower in the NW and NE, around 1.6, thus reflecting the energy efficiency trend of regions of older industrialization. It is interesting to notice that it is mildly higher in the Center (around 1.8) and remarkably so in the South (2.6). This feature can be explained with the increasing industrialization along the Southern Adriatic coast of Italy in some energy intensive productions, namely, car plants.

Imported material elasticity to output is definitely inelastic in the Northern regions (both North-West and North-East), with values around 0.7, and in the Center, with values around 0.5, thus suggesting that industrial development favors import substitution. The reverse can affirmed for the South, where industrial development calls for more than proportionate increase in imported intermediate products.

Moreover, notice that changes in the capital stock induces positive increments in labor demand, as expected, and with relatively increasing intensity from North to South. The elasticity is not far from 0.5 in the Northern regions and 0.8-0.9 in the Center and above unity in the South. This pattern obviously reflects the degree of implicit rationing of capital stock in the short period. The elasticity to capital is negative for energy demand in all regions, clearly indicating that relaxation of capital constraint occurs with increasing energy efficiency. Finally, materials demand is definitely inelastic to capital in the Center-northern regions, but the elasticity in negative only for the South. This pattern, again, is coherent with the interpretation of lagging industrialization of the South: capital accumulation in this region is clearly affecting imported technology requirement from outside.

The empirical estimations of the factor demand system allows to compute a derived quantity which is interesting from the microeconomic theory viewpoint: an economic measure of the capacity utilization. As far as capacity utilization is concerned, let us recall that usually computer indexes are statistical in nature and lack precise microeconomic foundations. Specifically, if the concept of capacity utilization has to be understood as the ratio of actual production (y) and potential production (y*), such as $cu = y/y^*$, then there arises the problem of defining what is potential product. Usually, when trend production is used, there lacks a coherent link with economic considerations, for the derived measure of potential output is intrinsically at

best an engineering concept, which does not take into account economic variables. On the contrary, the concept of potential product here used (due to Cassels 1937, Klein 1960 and more recently Berndt and Hesse 1986, Berndt and Morrison 1981, Morrison 1988) refers explicitly to output corresponding to the minimum of total average cost function, thus depending on the firm optimization problem. Operationally, potential product is obtained solving for the cost minimizing output the derivative of the cost function (1) with respect to output. In other words, potential output is a measure of production when all inputs are efficiently used, such that $y > y^*$ and $k < k^*$ if the shadow price of capital stock exceeds the ex ante market price.

Notice that when demand is relatively higher than supply, firms will tend to overutilize existing capital stock, which entails a reduction in its productivity and an increase in unit costs. Equilibrium has to be restored with increase in capital stock, until shadow and market price of capital are equalized. It is obvious that in this framework utilized capacity index may exceed unity, contrary to the engineering concept which is bounded below unity.

The computed regional differences in capacity utilization are quite striking (graph A1 in the Appendix). For all the Center-Northern regions there appears a condition of excess capacity throughout the period, with fluctuations. This pattern is similar to findings of Berndt and Hesse (1986). In particular, there is evidence of increase between the end of the 1970's and the beginning of the 1980's in the Northern regions, when real interest rates turned markedly positive after a long period of negative levels.

The slackness appears to be lower in North-East and Center than in North-West. Also short term fluctuations are accurately represented, considering that as consequence of oil shocks, in the 1974-75 and 1980-1982 and 1992-93 recessions the reduction in capacity utilization is explained by a lower desired capital stock, due to the long run substitutability relation between energy and capital. In the same way, the mild decline in the index in the late 1980's and early 1990's can be rationalized with changes in relative factor prices, which enter directly in the computations, again with plausible pattern around the 1993 recession.

A complete different picture emerges for Southern regions. In the early 1970's there was indication of shortage of capital, as indicated by the index above unity. The long run trend is clearly negative, as a result of the massive public investment policies, despite short term fluctuations along the economic cycles. Although dampened, the reduction continues in the more recent period, showing that there exist a structural situation of excess capacity in the South which is higher than in the rest of Italy.

Another interesting feature of the regional factor demand model is the possibility to investigate if there are interactions between the considered areas, i.e. spatial spill-overs;

obviously, such analysis cannot be conducted when using national aggregate data. The presence of such interactions can enrich the economic interpretation of the model. In the present case, such effects signal the possibility that output growth of an area may be apt to modify the development conditions of another adjoining area. This effect doesn't depend only on the possibility of factors movement among regions, but also from effects on demand and supply. There are two main transmission mechanisms: the first is positive, that concerns the existence of spill-over due to access to more ample markets (thick market externalities) and to the reduction of transfer costs of human capital and technologies; the other one is negative, that concerns the reduction of possibility of profitability, especially in presence of congestion costs.

Spatial effects modelling in Italian literature is still at an early stage (Anselin 1988, Arbia Espa 1996 and Paci Pigliaru 1999). The spatial connection between the regions is modelled through the definition of a spatial weights matrix that can measure nearness ranking, spatial distance in terms of travelling time or kilometre and so on. In this paper, we approximate the effects of spill-over between regions with the economic weight of a region, measured by output, and the physical proximity, measured by a distance index. Accordingly, we have built for every region a new variable defined as a weighted average of other regions output, the weights being given by the distance indices between regions. Adding this variable to the factor demand model proved statistically significant, thus confirming the importance of spill-over effects. Obviously, we consider this only a preliminary result, given the high level of regional aggregation. Nevertheless, notice that Bollino and Pellegrini (2000) find similar significance result of spill-over effects, using regional data for 20 Italian regions for the period 1980-1996.

The spill over effects are differentiated on factor demand and across regions and are, as expected, of second order magnitude with respect to output elasticities (see Table A7 in the Appendix, reporting the partial effects computed for the year 1995). Recall that a output augmenting spill over effect on the production function entails an increase in efficiency and therefore, yields a negative effect on the dual cost function. Hence, a negative effect on factor demand can be interpreted as an increase in efficiency, given the regional level of production.

We find that output spill-over has a negative impact, *ceteris paribus*, on factor demand in NW and S and a positive effect in NE and C. In general, the effects on labour demand are in absolute size greater than those on the other two factors. It is also interesting to notice that there asymmetries between contiguous regions: for instance, the effect on NW labor demand from NE is about -0.6%, while the reverse effect on NE labor demand from NW is about 0.13%. This means that an increase in economic activity in the NE has an indirect labor savings effect on NW productive technology. The same is true between C and S: the spill-over from C on S labor

demand is about –0.01%, while the reverse effect from S on C labor demand is 0.04%. In addition, notice that the effect on imported materials are almost negligible in all regions and, quite plausibly, that the effect on energy demand is positive and relatively high in the Center, a region with a sizable oil refining capacity.

Thus, we find preliminary evidence that there exist both types of spill-over effects: positive, associated with efficiency improvement as it shows the case of NW and S, and negative, associated with possible reduction in profitability as it is the case of NE and Center. These considerations are quite crucial for the South, showing that industrial growth in the rest of Italy yields, ceteris paribus, an increase in labor productivity, i.e. a reduction of labor output ratio.

4. INSTITUTIONS AS A FACTOR OF PRODUCTION

A large comparative literature exists on the link between institutions and economic performance (e.g. Tarantelli, 1986; Calmfors – Driffill, 1988; Soskice, 1990; Nickell - Layard, 1997; Signorelli, 2000). Here the institutions are considered as a particular and complex factor of production affecting the structure of the production function, with consequences on (regular) labour demand level and changes.

The institutional factors considered here can be distinguished in two groups. A first group of factors internal to the industrial relations system [co-operation and participation (+) vs. conflictuality (-); co-ordination of collective wage negotiations or decentralisation of wage negotiations with firms "price-taker" (+) vs. non-co-ordination or decentralisation with firms "price maker" (-); unions' and employer associations' membership plus "third actor" role (+/-); effectiveness of the training system (+/-)]. A second group of factors partly internal and partly external to the industrial relations system [active labour policies (+); labour tax wedge (-) and income policies (+/-); passive labour policies (-); rigidity of labour regulation (-).

So, important institutional factors are the degrees of industrial relations co-operation (at macro and micro levels), participation (at micro level) and conflictuality (at macro and micro levels). The adoption of co-operative strategies by the unions and employers' associations can favour the creation and distribution of positive net employment benefit in a non-zero sum game. In fact, a high degree of co-operation can partly avoid that the difference between individual rationality and general interest will produce less favourable equilibrium strategies (e.g. "prisoner dilemma"). A significant degree of workers' participation can determine a higher workers' "effort" and a better solution on the bargaining of the employment levels and dynamics. On the contrary, a low degree of co-operation and participation together with a high degree of industrial relations

conflictuality can negatively affect the employment levels and dynamics. In particular, a high degree of industrial relations conflictuality contributes to increase the economic uncertainty and a highly uncertain milieu for the firms remarkably affects the (quantitative and qualitative) decisions of investment in employment (Signorelli, 1997).

The large literature based on the degree of centralisation / co-ordination of wage negotiations (e.g. Calmfors and Driffill (1988) and Soskice (1990)), suggests that highly co-ordinated collective wage negotiations with firms "price-taker" permit a path of wage moderation, that is an important condition for higher employment performances. The first two authors argue that also a decentralised system of wage negotiations permit a high performance, if the product markets are characterised by a high degree of competition (firms "price-taker"). On the contrary, an intermediate (sectoral) level of collective wage bargaining without co-ordination favours a higher wage dynamic (Calmfors and Driffill, 1988). The hump-shaped model is based on the idea that organised interests are most harmful when they are strong enough to cause major "disruptions" but not sufficiently encompassing to bear any significant part of the costs for society of their actions in their own interests.

The employment effects deriving from the strategies of unions and employers associations depend on the membership composition and the "third actor[6]" role. A high representation of retired and the usual absence of unemployed in the unions' membership favour the creation and persistence of a "generous" pension system and wage dynamics higher than (labour) productivity changes, with probable negative effects on employment level. These tendences can be counterbalanced by a strong active role of the "third actor" in supporting the unemployed (and, secondarily, employed) interests. As for the employers' associations membership, an inadequate representation of the different groups of firms distinguished by dimension, sectors, regions, etc., can favour anomalous wage dynamics, with probable negative effects on the overall employment. These negative effects can be reduced by an active role of the "third actor" in the wage negotiation process.

A crucial positive factor that can favour a higher employment performance is the existence of an effective training system. It is important that the bargaining process between unions and employers' associations will regard also the (private and public) investment decisions in vocational training, on-the-job training and permanent training, with an active role of the "third actor", due to some characteristics of "public good" of the training production.

As regards the second group of variables, a positive factor is the adoption of active labour policies (effective services for favouring the matching between labour supply and labour demand; incentives for permanent training; incentives for the emersion of irregular employment;

[6] The "third actor" is composed mainly by the central government, but also by the regional and local administrations.

etc.). Income policies favouring wage moderation can avoid negative employment dynamics. Besides, the income and fiscal policies regard also the definition of the "labour tax wedge", with remarkable effects on regular and irregular labour demand. The above factors can be considered partly endogenous to the industrial relations system because they are rarely autonomously decided by the government, while usually they are bargained with the social parts. Analogously, the rigidity of labour regulation (limits to the type of contracts permitted; hire and fire rules; etc.) and the adoption of passive labour policies (unemployment benefits, early retirements, wage supplementation fund, etc.) can be (rarely) autonomously decided by the government, (often) bargained with the social parts or (some times) "imposed" by the unions. The effects on the national employment performance of rigid regulation and passive labour policies can be extremely negative (lower regular employment rate and higher irregular employment) especially in conditions of high economic uncertainty (Signorelli, 1997).

So, here we consider a complex set of intitutional factors, while in the existing literature, the various authors generally use just one or few crucial indicators for defining the industrial relations systems: level of collective bargaining, degree of co-ordination, degree of co-operation, etc. (Table A14). In the prevaling literature the Italian industrial relations system is recognised as characterised by a low degree of co-operation (e.g. Blyth, 1979), co-ordination (e.g. Layard, Nickell and Jackman, 1991) and centralisation (e.g. Schmitter, 1981; Calmfors and Driffill, 1988). We completely agree with the first two propositions but we strongly disagree with the third proposition. In fact, Italy has been characterised, especially in the period 1970-1992, by a high degree of "anomalous" centralisation[7].

Some comparative data on the Italian institutional characteristics and changes (employment protection, conflictuality, union density, bargaining coverage, degree of centralisation and co-ordination of wage negotiations and fiscal wedge) are presented in Appendix A (Table A8 – A13).

Starting from the negative institutional factors, we argue that Italy has been characterised, for a long period, by an anomalous centralised system of both normative and wage regulations. In particular, a rigid regulation of labour relations was introduced in 1970 (Law 300/70, so-called "workers' statute") and an automatic system of wage indexation ("scala mobile") was reformed in 1975. Especially during the 1980s it was remarkable the use of some "passive" labour policies (the "wage supplementation fund" and the "early retirements"). Some rigidities of the normative regulation were reduced in the 1980s (e.g. Law 863/84) and, especially, during the 1990s (e.g. Law 223/91), with a slow introduction of "active" labour policies, while the

[7] A similar interpretation is expressed in Somaini (1998).

centralised rigid system of definition of wage dynamic was abolished only in 1992. Especially due to unions pressure, the "full-time and permanent contract" remained, until recently, the dominant type of contract, with a consequent low diffusion of part-time, temporary contracts and more flexible structure of working-hours[8]. So, in the 1990s a more flexible "concerted" formal regulation prevail, with a shift from the passive to the active labour policies.

The conflictuality of the Italian industrial relations has been particularly high from the end of the 1960s to the early 1980s (Signorelli, 1992), with significant effects on the degree of systemic uncertainty[9].

The "dualisms" of the Italian industrial relations system have been particularly high in the whole period, with some partial changes. The normative favour (absence of firing risk; lower pensioning-age; long parental leave; etc.) and, in some periods, the wage advantages for the employees in the public sector have been particularly high in Italy compared to the other countries[10].

The existence of differences between non-exposed sectors (the public sector and many private services) and the exposed sectors (mainly, the manufacturing sector), as regards the possibility of passing on the prices the higher wages increases, affected the wage bargaining process with phenomenon of "wage run".

The importance of the sectoral level of wage negotiations is a structural characteristic of the Italian system with consequences of wage pressures reduced only after the "July agreements" of 1992-3 with a higher co-ordination at macro-level and flexibility at micro-level. The complex wage bargaining "articulation" has been substantially simplified in 1993 with the definition of two distinguished levels: the sectoral level, co-ordinated at national level using the planned inflation, and the firm (or territorial) level, linked to the productivity dynamics.

The "labour tax wedge" is an important institutional factor affecting the regular labour demand. In Italy, since early 1970s, it increased remarkably and now the "total labour cost" for the firms is around twice the "take-home pay" for the workers. Obviously, this is a strong incentive for "irregular employment". From the demand side, the firms can pay the same "net

[8] See the proposal of Valli (1988) consisting in an integrated system of different type of contracts distinguished by working-hours in order to matching the changing supply side need without ignoring the demand side conditions for a diffuse adoption of different contracts.

[9] But, the remarkable reduction of conflictuality, especially in the 1990s, was accompanied by a lower reduction of its macroeconomic costs, due to the increasing direct effects of strikes on "third parts" with respect to the two conflicting subject (e.g. the strikes in some public services).

[10] The 1993 "privatisation" of the labour relations in the public sector produced a partial but significant reduction of the normative and wage bargaining differences with the private sectors.

wage" of a regular contract with a saving rate of 50%[11]. From the supply side, the lack of regular job opportunities induces workers to accept irregular employment proposals[12].

As for the "positive" institutional factors, in Italy the degree of industrial relations co-operation at macro-level and participation at micro-level has been very low compared to the most (western) European countries and Japan. The adoption of co-operative strategies by unions and employers' associations increased remarkably in the 1990s with the so-called "concertation", while the degree of participation of workers to the firm level decision ("co-determination") is increasing but still very low compared, for example, to (west) Germany and Japan.

In recent years the decentralisation of placement office and, especially, of the active labour policies are important positive institutional innovation that must still be assessed in their employment impact.

As for the degree of co-ordination and flexibility of wage negotiations, it has been very low, especially in the period of adoption of a rigid automatic system of wage indexation (from 1975 to 1992) and presence of many uncoordinated wage bargaining levels (until 1993). In the early 1990s the abolition of the "scala mobile" and the institutionalisation of two different levels of wage bargaining (a sectoral level, co-ordinated at national level, and a firm or territorial level[13] linked to productivity changes) increased both the degree of flexibility and co-ordination of wage negotiation process.

The low effectiveness of the vocational training system has been partly due to the substantial absence of this argument from the bargaining process. Only in the 1990s the topic of training (on-the-job training; permanent training; etc.) entered in the collective bargaining and "concertation".

Another important factor of the industrial relations structure is related to the social parts membership and "third actor" role. The high and increasing weight of retired members (from the 14.2% in 1981 to the 40.7% in 1991)[14] together with the substantially absence of the unemployed, strongly affected the unions' strategies. On the other side, the dominant employers' association ("Confindustria") has been characterised, especially in some periods, by a strong decisional power of few large firms, while the employment share of small and medium-sized firms has been over the 70% of the total employment. The social parts membership and strategies interacted with a weak "third actor", mainly due to political instability.

[11] Besides, the irregular employment garantee to the firm the highest degree of "contractual, wage and numerical" flexibility.

[12] The uncertainty on the future public pension scheme, can incentive young workers to accept an irregular job, because the discounted value of the social contributions is quite low.

[13] A wage bargaining at firm level is usually realised in a limited number of (large and medium-sized) firms. So, for the majority of employees (in small firms) it is necessary a "territorial" wage bargaining.

So, differently from the previous decades, during the 1990s some rigidities of the formal regulation have been removed (abolition of the automatic system of wage indexation "*scala mobile*" in 1992; generalisation of the possibility of "nominal" hiring; etc.), the "anomalous" uses of the "wage supplementation fund" and "early retirements" were reduced, the conflictuality decreased and the industrial relations system became more co-operative and participated ("July tripartite agreements" in 1992 and 1993; "Employment Pact" in 1996; etc.). The persistence of a high "labour tax wedge" together with a still weak role of the "third actor" are the main negative institutional factor remaining also in the 1990s.

In short, in the Italian case the negative institutional factors surely overcome the positive factors in the last three decades, with the (partial) exception of the 1990s.

Some recent research (Signorelli, 1999a, 1999b e 2000) highlighted the probable "asymmetrical" causal link between institutions and employment performance. In particular the presence of a "good" institutional system seem to be a necessary but not sufficient condition for a high(er) employment performance, while a "bad" institutional system seem to be a sufficient (but not necessary) condition for a low(er) employment performance.

Besides, the existence of a "bad" institutional system characterised by an anomalous "centralisation" interacted perversely with the already existing remarkable regional differences, contributing to the persistence and worsening of the employment performance gaps[15].

In a recent research (Amendola et al., 1997) has been discussed the way by which institutional decentralisation can be implemented in a labour market characterised by deep regional differences and by long-term unemployment persistence. In particular, the main conclusion of the above research is that the institutional decentralisation is surely effective for the active labour policies; the actual aim of such supply-side policies is to reduce the regional and skill mismatches and therefore it needs a substantial involvement of local public agencies (Amendola et al., 1997).

Calmfors (1993) argues that, in countries where the labour market is geografically segmented, a greater regional coordination can improve the efficiency of wage bargaining process.

We argue that considering the (well-known) huge regional gaps in Italian employment performances together with the (new) evidences on remarkable regional differences in the production functions presented in the previous Section, the policy option of an institutional

[14] As for the changes in the composition of union membership, see Alacevich (1996, pp. 90-91).

[15] At regional level few attempt to assess the institutional differences on performance exist (e.g. Cellini – Scorcu, 1998). Some authors (Bodo – Sestito, 1992) highlighted the probable negative employment consequences for the South of a rigid labour market due to the union strategies and, especially, to the existence of a national collective bargaining.

decentralisation is strongly reinforced. Obviously, for the implementation of an effective institutional decentralisation, based on the subsidiarity principle, there are two major problems: (i) to identify the optimal size of the region for each (set of) institutional factor(s) and (ii) to consider and internalise the (positive and/or negative) externalities due to the existence of regional interactions and spill-overs.

5. A Quantitative Assessment of the Employment Impact of Regional Policy Strategies

We first briefly review some crucial results of the existing literature on the assessment of the employment impact of the main past structural policies and then we produce a quantitative assessment of the employment impact of planned policy strategies (2000-2006) under different scenarios.

The extraordinary intervention in the South of Italy started in 1950 with the creation of the "Cassa per il Mezzogiorno". The evolution of the policies is presented in Cosci – Mattesini (1998). Many authors show the low effectiveness of the policies for the South, especially considering the employment impact (Valli, 1993; Quintieri – Rosati, 1991). The recent changes in regional policies are considered by Del Monte (1998). Del Monte highlighted that the policies for the South had probably some positive employment effects, but surely they were too costly.

Regional policies strategies have been recently designed by the Italian Treasury Ministry ("*Programma di Sviluppo del Mezzogiorno* 2000-2006"), including several measures designed to foster employment. As planning and implementation are still at a early stage, it is interesting the analysis on the ex-ante evaluation of such policy design, in the attempt to provide a quantitative assessment of the foreseeable impact of such measures onto relative factor prices and factor demand, with a particular attention to employment effects.

First, in order to assess the overall performance of the model presented in Section 3, we have simulated the system from 1972 to 1999. Detailed official regional data are available for the period 1990-1995, while in the period 1996-1999 complete data are available only at the national level. Some preliminary estimations for South were released by Svimez (2000). The simulation exercise is as follows. We have preliminarily estimated the exogenous variables at the regional level up to 1999, and then we have dynamically simulated the model for the 4 regions. Subsequently, we have aggregated the regional results into national variables, in order to compare these results with Italian historical data. The results of the tracking performance of the model are reported in graph A2 (Appendix). According to usual simulation statistics (correlation coefficient square, root mean square error RMSE of historical vs. simulated values, regression

coefficient of actual on predicted values and U Theil statistics), we deem that the tracking performance of the model is quite satisfactory. Generally, all correlation statistics are well above 90%, with particular accuracy showed by the labor demand equation, with correlation in the 98-99% range for all four regions and 99.4% at the national aggregate level. The labor demand RMSE translated into percentage terms is about 2.5%, which is quite accurate. Also the imported energy and materials show generally high correlation and low error, considering the high variability of historical data. The simple investment adjustment equation is able to track investment fairly well in the center-northern regions, while the simulation error is larger for South; this is not surprising, given that investment determinants in the South include subsidies and public intervention which are not modelled here in detail. In addition, regression coefficients are generally in the 0.98 - 1.01 range, with few exceptions, such as energy demand in South (0.80) and investment in the CN regions (1.05), due to the unexpected reduction in investment growth of the late 90's. The U Theil statistics is around 0.015 for labor, 0.09 for energy, 0.04 for imported materials and 0.03 for investment.

In general, the model tracks fluctuations in labor, energy and imports with fairly good precision, also compared with other existing models. Moreover, notice that the model tends to react to energy and import price changes more markedly than actually occurred in 1995, when a short-lived devaluation of the Italian Lira occurred.

Having assessed the performance of the model in the historical period, let us now revert the attention to the future period, considering the horizon of the Structural Funds policy 2000-2006. Firstly, we have simulated a baseline solution, which shares the relevant assumptions of the baseline adopted by the Ministry of Treasury in the official planning documents transmitted to the EU for approval (Ministero del Tesoro, 1999), in terms of output growth, interest rate and price developments.

Subsequently, in order to study the regional differences in responses to policy actions, we have simulated several alternative scenarios.

A first group of five simple policy measures is given by: (i) a one point reduction in interest rate which enters into the user cost of capital, capturing the essence of a monetary stance more favourable to investment growth; (ii) a one point reduction in wage rate, capturing a wage subsidy policy or the reduction in the "labour tax wedge"; (iii) a 2.5 percentage points exogenous increase in capital formation, capturing a direct government intervention to spur investment via capital subsidy (like the subsidy funds called "Legge 488"); (iv) a one point exogenous increase in output demand, which can be interpreted, given the budget constraint imposed by EMU, either as a balanced reduction in taxation and public expenditure (on non industrial goods) or as

a structural intervention in favor of competitiveness of industrial goods; (v) a generalized one point reduction in all factor prices, which can be interpreted as an improvement in the institutional structure or as a reduction in production cost due to lower taxation on business[16] or as structural policy reforms aimed at enhancing factor flexibility uses and competitiveness. In order to study the differences in the regional intensity of responses, all shock are equal across regions, e.g. a one point reduction in wages is applied equally to all four regions, and so on.

The results, reported in Table A15 (in the Appendix), are quite revealing. In order to understand the data, notice that results are presented in terms of geometric average period percentage differences in the last year of simulation between scenario and baseline, so that they can be directly interpreted as growth rate differences between scenario and baseline. The crucial result to notice is that there are differences in responses of each variable across regions to the same policy scenario and there are differences in magnitude and direction of responses of each variable to alternative scenarios.

Labor demand is more responsive in S to interest rate than other regions, about 0.6%, but is less responsive to wage than other regions, (about 0.5% versus 0.7%) as already highlighted previously by the elasticity analysis. Notice also that the response in S is on average to investment growth increase, while the lowest response occurs in C. As the cumulated exogenous increase in investment is 6%, a labor increase of 3% indicates that the technology improvement appears to be labor saving.

Labor demand in S is the least responsive to output demand increase, while in NW and NE the response is considerably higher, thus confirming the ranking established with the analysis of the partial elasticities in Table A6. Notice also that when all factor prices are decreased, mimicking a lower taxation policy, the labor demand response in S is highest, about 1.1%, while it is lowest in C. These results confirm the intuition that the old fashion approach to stimulate demand is the least effective way to spur employment in the South. In fact, notice that in this case the import materials response in the S is almost double (about 0.35%) than in the rest of Italy: demand increase calls for an increase in imported inputs.

In general, notice that energy demand responses to simulated shocks show that enterprises seek energy efficiency with new investment and that responses to output is elastic.

Also, imported material responses are quite insensitive to interest rate reduction and are negative when wages are reduced, signaling a plausible substitution effect.

In the lower taxation scenario, energy and materials responses are opposite in sign: the former is positive (0,9 on Italian average) and the latter is negative (-0.9 on Italian average).

[16] Notice that it would be inappropriate to interprete this scenario as a measure of scale economies, for investment is

Since the energy cost is lower in absolute value than other imported materials, this result indicates that policies improving enterprise profitability are also beneficial for the trade balance[17].

Investment and optimal capital stock responses to various factor price shocks are obviously similar: there is a positive effect of interest rate reduction, of wage reduction, and of taxation reduction, to be understood as the indirect effect of import substitution, thus using more internal resources for production.

In order to understand the simulated results on investment of output increase, notice that a once-and-for-all output growth forces initially an increase in utilized capacity, given unchanged ex ante market price of capital and therefore a reduction in productivity of capital and increase in optimal capital stock and investment. Subsequently, new investment adds to the existing capital, restoring capacity utilization, so that after 6 years the effect almost fades away.

All these results signal clearly that in the S a differential wage subsidy is not an effective policy and that a direct investment policy subsidy does not exert a stronger effect than in the rest of Italy. Moreover, an exogenous output demand growth results in a stronger increase in labor demand in those regions where the unemployment is lower, that is NW and NE. The only particularly effective differential policy favorable to the S appears to be a relaxation of constraints which hamper profitability, i.e. a reduction of all factor costs. The improuvment of institutional structure can be considered as an implicit reduction in all factor costs. Obviously, interest rate reduction appears to have a relatively stronger effect in the S, plausibly because of relaxation of bank credit rationing.

In order to appreciate the relative effect of the different policies under the alternative scenario, let us consider the relative magnitude involved. The increase in labor demand under the scenario (v) is 1.08, while the corresponding increase under scenario (iv) is 0.18. Consider that the estimated production cost is in the year 2000 is about 88% of the value of output. This means that one euro of public resources devoted to factor price reduction has to be compared to an amount devoted to obtain an output increase equal to 1.13 euro (the reciprocal of 0.88). If we assume an aggregate demand multiplier of two (which is obviously not captured in the present analysis of the supply side), this means that a policy of factor price reduction exhibits a relative

endogenous and so the capital constraint is changing.

[17] Obviously, this line of reasoning does not take into account the fact that energy is imported largely from outside EU, while other imports are not.

effectiveness, in terms of employment growth in the South, almost 3.5 times that of a policy of direct public expenditure[18].

In addition, consider that investment is roughly 25% of the value output or 29% as a percentage of the estimated production cost in the year 2000. Thus, an increase in investment subsidy of 2.5% corresponds roughly to a policy of reduction of factor costs of 1%; therefore the relative magnitudes of scenario (iii) and(v) responses are directly comparable. It can be concluded that the relative effectiveness of investment subsidy is around one and a half times.

Furthermore, we have investigated other composite policy measures scenarios aimed at spurring labor demand in the South more intensively. We have envisaged an adverse interest rate increase of about 2 %, due to BCE policy for defending Euro quotation versus US Dollar and controlling inflation expectations and tendencies, together with (vi) a reduction in the wage rate of about 0.5% in all Italy, coupled with a 2,5% reduction in the South, thus implementing a favourable differential of 2 points for the South; (vii) a reduction of all factor price of 1% in all Italy and a further favourable differential of 2 point in the South; (viii) a general factor price reduction as in vii above complemented with a stronger wage reduction in the South of an additional 1% (Table A16).

The results are quite revealing: in the presence of a capital cost increase, investment and optimal capital stock are adversely influenced and even a substantial wage reduction is not capable of spurring labor demand: the Italian average differential labor growth w.r.t. to the baseline is unaffected, with an adverse composition effect against the South (scenario vi). A more courageous factor price reduction is capable to bring a 0.5-0.6% increase in labor demand in all regions (scenario vii). A further favourable wage differential in the South appears to raise the labor demand growth in the South considerably above the Italian average.

The above simulations under different scenarios allow to compare the relative effectiveness for the South of different policy strategies. Besides, the results highlighted the difficulties of obtaining remarkable effects with simple measures and they clearly point towards an integrated set of economic and institutional policies in order to increase significantly the regular labour demand of Southern region.

[18] The computation is as follows: the relative response ratio is 1.08 / 0.18 which equals 6; this ratio times 1.13 and divided by 2 yields 3.39.

6. CONCLUSIONS AND POLICY SUGGESTIONS

The main conclusion of the paper is that the huge (economic and employment) regional gaps and the remarkable regional differences in the production functions interacted perversely with an inadequate and prevailing centralised institutional framework, contributing to the persistence of an extremely low regular labour demand in Southern region.

In order to assess the relevant regional differences in production technology, we have estimated a system of factor demand: labor, energy and imported materials (as variable factors), conditional to the existence of a quasi-fixed factor, the capital stock, and investment for 4 Italian regions: Northwest, Northeast, Center and South. The specification is parametrized with a Generalized Leontief production function for the industrial sector of the Italian regions in period 1970-1995.

The significance of regional differentiation of productive technology is a new result in the Italian empirical literature, suggesting four main conclusions:

- first, there is a meaningful difference in the productive technologies at the regional level, confirming that South shows relatively quite different behavior in terms of several factor demand elasticities:
    - for materials, elastic own price and output elasticity; negative elasticity to capital stock;
    - for energy, much higher output elasticity and more negative capital stock elasticity;
    - for labor, much lower cross elasticity with respect to energy price;
- second, the labor price elasticity is higher in NW;
- third, the output elasticity are quite similar across all regions, but this is not so for the elasticity to the fixed factor;
- fourth, the magnitude and direction of these differences hint that there are relative similarities between North-East and Center, consistent with the well known analysis of the so called "Adriatic area development", which comprises North-east and the east coast of the Center.

The analysis of spatial spill-overs highlighted the existence of interactions between the considered areas. In particular, the (industrial) growth in North and Center yialds, ceteris paribus, an increase in labour productivity in the South (i.e. a reduction of labour output ratio).

The institutions has been considered as a particular and complex factor of production affecting the structure of the production function and, in particular, the (regular) labour demand.

We have considered a first group of institutional factors internal to the industrial relations system (degree of co-operation, participation and conflictuality; degree of co-ordination and decentralisation of wage negotiations; interaction between unions' and employer associations'

membership and the "third actor" role; effectiveness of training system) together with a second group of factors partly internal and partly external to the industrial relations system (active and passive labour policies; rigidity of the regulation of labour relations; income policies and "labour tax wedge").

In the Italian case, during the last three decades, the negative institutional factors surely overcome the positive factors, with the partial exception of the 1990s. In particular the Italian institutional framework has been characterised for many years by (1) an anomalous centralised system of both normative and wage regulations together with a low degree of co-ordination of wage negotiations, (2) a high degree of industrial relations conflictuality and, partly as a consequence, by an extremely low degree of co-operation and participation, (3) the prevalence of passive labour policies on active labour policies, (4) an inadequate (both as quantity and quality) training investment, (5) a high influence of social parts strategies, conditioned by the membership, favoured by a weak role of the "third actor", mainly due to political instability, (6) an extremely high "labour tax wedge" on regular employment.

In particular, the existence of a "bad" institutional system characterised by an anomalous "centralisation" interacted perversely with the already existing remarkable regional differences, contributing to the persistence and worsening of the employment performance gaps.

Some significant positive institutional changes have been recently introduced, especially since 1992, but the process of decentralisation and flexibilisation is still incomplete. For a better institutional framework, the compared empirical analysis suggests to (1) improve the decentralised negotiations and the workers participation (e.g. favouring the diffusion of profit-sharing schemes and permanent training investment), (2) reduce some rigidities of the normative regulation (e.g. increasing the contractual flexibility), (3) favour a stronger role of the "third actor", in accordance with the subsidiarity principle, and complete the shift from the passive to the active labour policies (e.g. realising reforms for a higher political stability and completing the process of political, administrative and fiscal decentralisation), (4) decrease the incentive for irregular employment[19] (e.g. reducing the "labour tax wedge").

However, the asymmetrical effectiveness of the institutional system on (regular) labour demand highlight that a "good" institutional framework is just a necessary (but not sufficient) condition for a high(er) employment performance.

[19] In this paper we do not even attempt to address the issue of irregular workers and "underground" (tax evading) activities, because we think that it deserves careful and thorough statistical data investigation. Obviously, our simulations simply show that any tax reduction which lowers the threshold of legal operations may contribute to bring "aboveground" previously hidden workers. This can statistically contribute to increase the regular employment.

In order to assess the relevance of the Italian Government development policy presented to the EU for the Structural Funds 2000-2006 and recently approved by the European Commission, we have simulated alternative policy scenarios with the regional model, including a dynamic investment adjustment toward optimal capital stock, for the period 2000-2006. The main results are as follows:

- Center-North technology is more responsive to labor cost, but less to capital changes, than the South; in particular, labor demand responses in NW are highest as compared to other regions;
- South technology displays the greatest difference between labor elasticities to output (lower) and to capital (higher);
- South technology displays a negative materials demand elasticity to capital;
- alternative policies have different regional impacts: wage reduction, investment subsidy and output demand stimulus are most effective in the North and the least in the South while, on the contrary, cost reduction policies exert higher impact on the South than in the rest of Italy;
- in terms of labor demand responses in the South, for a given level of public resources, the most effective policy action is investment subsidy; lower business taxation is next, exhibiting a relative effectiveness of 2/3 of the former; direct demand stimulus exhibits even lower effectiveness, equal to 1/5 of the investment subsidy.

The policy implications stemming out of these results are quite clear: in order to spur employment, it is wise to envisage for the South a high priority policy aimed at the relaxation of capital constraints, especially in terms of public infrastructures (for which the capital stock estimated in the equation is probably a proxy), rather than subsidizing labor costs. Thus, in order to improve the allocative efficiency of public funds, it should be advocated a new strategy of public investment and the strengthening of new capital subsidies, rather than continuing with labor subsidy. Notice, however, that capital subsidy is relatively less effective in the South than in the North, in terms of labor growth. Thus, unless carefully differentiated by regions, such a policy risks to widen rather than closing the gap between North and South.

The results of the scenario of business cost reduction show that this action is more effective for employment than direct public expenditure and, in addition, benefits relatively the South more then the North. We consider this result as an indication in favor of decentralization: in fact, a policy action aimed at cost reduction leaves more freedom of choice to the enterprise to optimally combine inputs and technology than a constrained subsidy to a specific production

factor. Because the inprovements in the institutional framework can be mainly considered as an implicit cost reduction, they would benefit especially the South.

In conclusion, the crucial policy suggestion of this research is to increase the effort for the definition and implementation of an effective decentralisation along two main complementary lines: (1) reducing taxation and (2) completing the reform of institutions. The first leads to a higher (microeconomic) flexibility in the decision making at the decentralised (firm) level, and the second favours a better (macroeconomic) flexibility at the systemic (national and local) level. We argue that the above institutional and fiscal policies can permit and favour a significant improvement of the Italian employment performance, especially in Southern region.

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Appendix A

Table A1 Production structure , labor cost and productiv

(Mezzogiorno Regions, Center, Center-north and Italy)

year 1995

Variables	**Abruzzo**	**Molise**	**Campania**	**Puglia**	**Basilicata**	**Calabria**	**Sicilia**
GDP procapite (1990 prices)	20,8	17,8	14,8	16,4	15,5	13,6	14
GDP procapite (current prices)	26,7	22,5	19,0	20,9	19,6	17,4	19
GDP procapite (1990 prices) (Italy=100)	87,8	74,9	62,3	68,9	65,1	57,4	62
GDP procapite (current prices) (Italy=100)	88,0	74,0	62,8	68,8	64,4	57,3	63
GDP composition (1990 prices)	1,9%	0,4%	6,4%	4,9%	0,7%	2,1%	5,7
GDP composition (current prices)	2,0%	0,4%	6,5%	4,9%	0,7%	2,1%	5,8
Value added, industrial/total	21,1%	16,5%	14,2%	15,5%	15,8%	7,7%	8,2
Net imports / Total resources (current prices)	2,2%	12,1%	9,4%	7,0%	14,7%	23,3%	14,8
Savings / GDP	15,3%	10,2%	3,4%	8,2%	6,7%	-11,0%	-2,6
Gross fixed Investiments / GDP (*)	17,2%	23,6%	14,9%	13,7%	23,3%	20,9%	15,7
Employment, dependents (***)	92,5	12,8	166,6	142,8	18,1	32,8	98
Employment, total (***)	97,7	16,8	219,1	180,1	24,3	44,2	118
Compensation per employee (***)	29,8	32,3	33,4	29,8	31,9	27,3	30
Social contribuitons per employee (***)	10,3	11,2	11,6	10,0	11,0	6,9	9
Labor cost per employee (***)	40,1	43,5	45,0	39,8	42,9	34,2	39
Productivity (***)	56,2	58,5	56,1	56,7	62,8	49,6	52
Labor cost per unit of output (100 lit of V.A.) (***)	71,3	74,3	80,2	70,2	68,2	68,9	74
Compensation per employee (Italy=100)	87,9	95,2	98,4	87,8	94,1	80,5	88
Labor cost per employee (Italy=100)	80,1	86,8	89,8	79,5	85,6	68,3	78
Productivity (Italy=100)	82,7	86,1	82,5	83,3	92,4	73,0	77
Labor cost per unit of output (Italia=100)	96,9	100,9	108,9	95,4	92,7	93,6	101
Unemployment rate (****)	9,4	16,5	25,3	16,8	17,9	23,3	22
Activity rate	38,9	38,6	35,2	34,2	35,1	35,1	33

Table A2 - Employment Rates, Unemployment Rates and Net Job Creation (1973-1996)

	ER 1973	UR 1973	NJC 73-83	ER 1983	UR 1983	NJC 83-93	ER 1993	UR 1993	NJC 93-96	ER 1996	UR 1996	NJC 73-96
North-west	*58.8**	*4.9**	*-1.1*	*57.7*	*7.2*	*-0.8*	*56.9*	*8.3*	*-0.3*	*56.6*	*8.9*	*-2.2**
North-east	*59.1**	*4.6**	*-1.0*	*58.1*	*7.6*	*+1.2*	*59.3*	*6.9*	*+0.3*	*59.6*	*6.9*	*+0.5**
Centre	*53.8**	*7.5**	*+0.2*	*54.0*	*9.0*	*-0.4*	*53.6*	*12.0*	*-0.9*	*52.7*	*13.7*	*-1.1**
South	*49.1**	*9.8**	*-0.9*	*48.2*	*13.6*	*-5.3*	*42.9*	*23.4*	*-2.9*	*40.0*	*28.6*	*-9.1**
ITALY	55.1	6.2	–0.1	55.0	9.3	-2.3	52.7	10.6	-1.4	51.3 (18)	12.0 (16)	-3.8 (14)
Australia	68.5	1.8	-6.4	62.1	9.8	+2.9	65.0	11.0	+3.3	68.3 (10)	8.5 (12)	-0.2 (9)
Austria	64.4	…	-1.5	62.9	4.1	+3.9	66.3	4.3	+1.8	68.1 (11)	5.3 (4)	+3.7 (8)
Belgium	60.7	2.4	-7.2	53.5	13.2	+2.8	56.3	12.0	+0.3	56.6 (17)	9.5 (14)	-4.1 (15)
Canada	63.1	5.5	+1.7	64.8	10.9	+2.9	67.7	11.2	+0.8	68.5 (9)	9.7 (15)	+5.4 (5)
Denmark	75.2	0.9	-3.4	71.8	11.4	+2.0	73.8	10.7	+0.9	74.7 (4)	6.9 (8)	-0.5 (11)
Finland	70.0	2.3	+3.2	73.2	5.4	-12.2	61.0	17.7	+1.2	62.2 (15)	16.1 (18)	-7.8 (18)
France	65.9	2.7	-3.9	62.0	8.3	-2.5	59.5	11.6	+0.1	59.6 (16)	12.3 (17)	-6.3 (17)
Germany	68.7	1.0	-6.5	62.2	7.9	+3.6	65.8	7.9	-0.2	64.0 (14)	9.0 (13)	-4.7 (16)
Japan	70.8	1.3	+0.2	71.0	2.6	+3.2	74.2	2.5	+0.4	74.6 (5)	3.4 (1)	+3.8 (7)
Netherlands	56.3	2.2	-4.3	52.0	11.8	+12.1	64.1	6.2	+1.9	66.0 (13)	6.5 (7)	+9.7 (2)
N. Zealand	64.4	0.2	-2.8	61.6	5.6	+5.2	66.8	9.4	+5.4	72.2 (7)	6.1 (6)	+7.8 (4)
Norway	67.7	1.5	+9.6	77.3	3.4	-3.5	73.8	6.0	+3.0	76.8 (1)	4.9 (3)	+9.1 (3)
Portugal	62.4	2.5	+7.3	69.7	7.8	-2.0	67.7	5.5	-0.5	67.2 (12)	7.5 (9)	+4.8 (6)
Spain	61.0	2.5	-11.5	49.5	17.0	-2.8	46.7	22.4	+1.4	48.1 (19)	21.9 (19)	-12.9 (19)
Sweden	73.6	2.5	+6.6	80.2	3.5	-6.3	73.9	8.2	-1.2	72.7 (6)	8.1 (10)	-0.9 (12)
Switzerland	77.7	…	…	…	0.9	…	78.5	3.8	-2.4	76.1 (2)	3.8 (2)	-1.6 (13)
U. K.	71.4	2.2	-4.4	67.0	11.2	+2.5	69.5	10.3	+1.5	71.0 (8)	8.2 (11)	-0.4 (10)
U.S.A.	65.1	4.8	+2.9	68.0	9.5	+5.2	73.2	6.8	+1.8	75.0 (3)	5.4 (5)	+9.9 (1)
Mean (19)	66.4	2.5	-1.2	64.7	8.1	+0.8	66.1	9.4	+0.9	67.0	8.7	+0.6

Source: OECD – Employment Outlook, 1997. The data for the Italian macro-regions are based on the database CNR-FGB-ISTAT 1, considering the age 15-64.

Legend: ER (Employment Rate) = Total Employment x 100 / working-age population (15-64).
UR (Unemployment Rate) = Total Unemployment x 100 / Labour Force.
NJC (Net Job Creation) = ER (year t) – ER (year m < t).

Note: * the first year is 1977 instead of 1973.
Ranking in bracket.
The data for Germany before 1990 refer to West Germany.

Table A3 - Dualism in the Structure of the National Employment Performances (1996):

	Unemployment Rates (a)								Employment Rates (b)							
	M	W	W-M	15-24	25-54	55-64	Y-A	O-A	M	W	M-W	15-24	25-54	55-64	A-Y	A-O
Australia	8.9	8.0	-0.9	14.8	6.8	8.0	+8.0	+1.2	77.3	59.3	+18.0	59.9	74.7	42.3	+14.8	32.4
Austria	5.3	5.2	-0.1	6.9	5.1	4.6	+1.8	-0.5	76.9	59.2	+17.7	55.5	79.3	29.4	+23.8	49.9
Belgium	7.4	12.4	+5.0	20.5	8.6	4.5	+11.9	-4.1	67.3	45.8	+21.5	26.1	73.9	21.8	+47.8	52.1
Canada	9.9	9.4	-0.5	16.1	8.6	7.7	+7.5	-0.9	74.8	62.2	+12.6	51.6	76.5	44.2	+24.9	32.3
Denmark	5.5	8.4	+2.9	10.6	6.0	6.1	+4.6	+0.1	81.4	67.8	+13.6	66.0	82.2	47.5	+16.2	34.7
Finland	15.8	16.5	+0.7	24.7	13.9	25.0	+10.8	+11.1	65.4	58.9	+6.5	33.6	75.8	34.8	+42.2	41.0
France	10.4	14.2	+3.8	26.3	11.0	8.6	+15.3	-2.4	67.2	52.1	+15.1	21.5	76.9	33.5	+55.4	43.4
Germany	8.1	10.2	+2.1	8.0	8.0	17.9	0.0	+9.9	73.4	54.3	+19.1	51.2*	76.1*	35.7*	+24.9*	40.7*
ITALY	9.6	16.5	+6.9	34.1	9.3	4.3	+24.8	-5.0	66.4	36.5	+29.9	25.4	65.5	27.3	+40.1	38.2
Japan	3.4	3.4	0.0	6.6	2.7	4.2	+3.9	+1.5	88.5	60.7	+27.8	45.1	79.6	63.6	+34.5	16.0
Netherlan.	5.2	8.1	+2.9	11.4	5.6	4.0	+5.8	-1.6	76.6	55.0	+21.6	54.1	75.8	30.0	+21.7	45.8
N. Zealand	6.1	6.1	0.0	11.7	4.9	3.7	+6.8	-1.2	80.6	63.8	+16.8	59.6	78.4	53.8	+18.8	24.6
Norway	4.8	4.9	+0.1	12.5	3.9	2.2	+8.6	-1.7	81.9	68.9	+13.0	52.1	83.6	64.7	+31.5	18.9
Portugal	6.6	8.5	+1.9	16.7	6.4	4.7	+10.3	-1.7	76.1	58.7	+17.4	37.0	79.2	46.2	+42.2	33.0
Spain	17.6	29.6	+12.0	42.0	19.3	11.6	+22.7	-7.7	63.0	33.4	+29.6	25.7	60.2	33.0	+34.5	27.2
Sweden	8.4	7.4	-1.0	15.7	7.0	7.6	+8.7	+0.6	74.7	70.6	+4.1	40.3	81.8	63.4	+41.5	18.4
Switzerl.	3.5	4.3	+0.8	4.9	3.8	3.5	+1.1	-0.3	86.1	66.0	+20.1	61.1	80.2	57.5	+19.1	22.7
U. K.	9.7	6.3	-3.4	14.7	7.0	7.1	+7.7	+0.1	77.7	64.1	+13.6	60.3	77.5	47.7	+17.2	29.8
U.S.A.	5.4	5.4	0.0	12.0	4.3	3.4	+7.7	-0.9	82.3	68.1	+14.2	57.6	80.2	55.9	+22.6	24.3
Mean	8.0	9.7	+1.7	16.3	7.5	7.3	+8.8	-0.2	75.7	58.2	+17.5	46.5	76.7	43.8	+30.2	32.9

Source: OECD – Employment Outlook (1997, July).

Legend: (a) = total unemployment x 100 / labour force. (b) = total employment x 100 / working-age population (15-64). * = 1995. W = Women. M = Men. Y = Young (15-24). A = Adult (25-54). O = Old (55-64).

Table A4 - Working-Age Population (15-64) Composition (1996)

	ER	(PTER)	(FTER)	URWAP	(LTURWAP)	(STURWAP)	NPRWAP	100-ER
Australia	68.3	17.1	51.2	6.4	1.8	4.6	25.3	31.7
Austria	68.1	10.1	58.0	2.9	0.7	2.2	29.0	31.9
Belgium	56.6	7.9	48.7	7.2	4.4	2.8	36.2	43.4
Canada	68.5	12.9	55.6	7.2	1.0	6.2	24.3	31.5
Denmark	74.7	16.1	58.6	5.5	1.5	4.0	19.8	25.3
Finland	62.2	5.0	57.2	11.9	4.3	7.6	25.9	37.8
France	59.6	9.5	50.1	8.2	3.2	5.0	32.2	40.4
Germany	64.0	10.4	53.6	6.3	3.0	3.3	29.7	36.0
ITALY	51.3	3.4	47.9	7.2	4.7	2.5	41.5	48.7
Japan	74.6	16.0	58.6	2.6	0.5	2.1	22.8	25.4
Netherlan.	66.0	24.1	41.9	4.6	2.3	2.3	29.4	34.0
N. Zealand	72.2	16.2	56.0	4.3	0.7	3.6	23.5	27.8
Norway	76.8	20.4	56.4	3.9	0.5	3.4	19.3	23.2
Portugal	67.2	5.8	61.4	5.2	2.8	2.4	27.6	32.8
Spain	48.1	3.8	44.3	13.2	7.4	5.8	38.7	51.9
Sweden	72.7	17.2	55.5	6.3	1.1	5.2	21.0	27.3
Switzerl.	76.1	20.9	55.2	3.2	0.8	2.4	20.7	23.9
U. K.	71.0	15.7	55.3	6.1	2.4	3.7	22.9	29.0
U.S.A.	75.0	13.7	61.3	4.2	0.4	3.8	20.8	25.0
Mean	67.0	12.5	54.5	6.1	2.1	4.0	26.9	33.0

Source: OECD – Employment Outlook (1997, July).
Legend: ER = employment x 100 / working-age population (15-64).
PTER = part-time employment x 100 / working-age population.
FTER = full-time employment x 100 / working-age population.
URWAP = unemployment x 100 / working age population.
LTURWAP = long term unemployment (more than one year) x 100 / working age population.
STURWAP = short term unemployment (less than one year) x 100 / working age population.
NPRWAP = non participation rate as % of WAP = 100 – (ER + URWAP).

Table A5 - Employment Rate, Unemployment Rate and Net Job Creation

	UR (1998)	ER (1998)	ΔUR (1993-1998)	NJC (1993-1998)
Piemonte	8.8	45.0	+1.6	-1.2
Valle d'Aosta	3.7	50.5	-1.9	-1.0
Lombardia	5.8	48.6	0.0	-0.2
Trentino Alto Adige	3.4	52.4	-0.6	+0.6
Veneto	5.2	48.5	-0.1	+0.3
Friuli Venezia Giulia	5.8	45.1	-1.1	+1.2
Liguria	10.9	39.8	+1.5	-0.2
Emilia Romagna	5.7	48.7	-0.3	-0.3
Toscana	8.2	43.8	0.0	-0.7
Umbria	8.9	41.4	+1.8	-1.6
Marche	6.7	44.9	0.0	-0.9
Lazio	12.4	41.4	+2.5	-1.4
Abruzzo	9.6	40.7	+0.7	-1.6
Molise	17.5	38.0	+4.3	-3.1
Campania	24.9	33.4	+5.5	-2.6
Puglia	20.9	34.5	+7.0	-3.0
Basilicata	18.9	34.8	+4.0	-2.5
Calabria	26.8	31.7	+6.6	-4.2
Sicilia	25.2	31.9	+5.5	-2.2
Sardegna	21.5	36.2	+3.2	-1.0

Source: Istat

Legend: UR = unemployment rates; ER = employment rates; ΔUR = changes in unemployment rates; NJC = changes in employment rates.

Table A6 Estimated factor demand elasticities

elasticities with respect to:

NORTH WEST

year 1987

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.64	-2.08	0,06	0.49	0,59
Energy	-0.11	-0.29	0.13	1,60	-0.59
Materials	0,75	2.37	-0.96	0,70	0.27

year 1990

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.68	-1.59	0,87	0.49	0,62
Energy	-0.11	-0.10	0.13	1,58	-0.57
Materials	0,79	1,69	-1.00	0,71	0.27

year 1995

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.82	-2.06	0,75	0.50	0,65
Energy	-0.16	-0,0	0.12	1.56	-0.49
Materials	0,97	2.06	-0.87	0,72	0.28

NORTH EAST

year 1987

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.54	-3.33	1.04	0.41	0.47
Energy	-0.089	-0.68	0.18	1.52	-0.76
Materials	0,63	4.01	-1.22	0,71	0.25

year 1990

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.56	-3.07	1.04	0.39	0,62
Energy	-0.094	-0.37	0.17	1.56	-0.77
Materials	0,66	3.44	-1.21	0,71	0.25

year 1995

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.69	-4.28	0,89	0.43	0,84
Energy	-0.13	-0.17	0.15	1.49	-0.54
Materials	0,82	4.45	-1.04	0,72	0.25

Cont.d Table A6 Estimated factor demand elasticities

elasticities with respect to:

CENTER

year 1987

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.54	-1.84	0,98	0.45	0,78
Energy	-0.088	-0.39	0.17	1,82	-0.79
Materials	0,62	2.24	-1.15	0.51	0.47

year 1990

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.58	-1.0	1.02	0.46	0,84
Energy	-0.098	-0.12	0.16	1,80	-0.75
Materials	0,68	1.11	-1.19	0.55	0.46

year 1995

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.63	-1.77	0,91	0.46	0,96
Energy	-0.12	-0.09	0.15	1,81	-0.72
Materials	0,74	1,85	-1.06	0.56	0.50

SOUTH

year 1987

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.47	-0.38	2.24	0.39	1,91
Energy	-0.077	-0.13	0.43	2,76	-1.68
Materials	0.55	0.51	-2.66	1,90	-0.90

year 1990

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.47	-0.35	2.43	0.40	1.05
Energy	-0.079	-0.09	0.44	2,71	-1.56
Materials	0.55	0.44	-2.87	1,82	-0.73

year 1995

Factor demand	labor price	energy price	materials price	output	capital stock
Labor	-0.50	-0.33	2.01	0.51	1.24
Energy	-0.094	-0.06	0.37	2.59	-1.32
Materials	0.59	0.39	-2.38	1,86	-0.58

Table A 7 Spill-over effects on factor demand – year 1995 (*)

(percentage elasticities)

Northwest

Spill-over effect from region: *on factor demand:*	S	NW	NE	C
L	-0.044	0.00	-0.62	-0.052
E	-5.86D-03	0.00	-0.082	-6.95D-03
M	-7.64D-04	0.00	-0.011	-9.07D-04

Northeast

Spill over effect from region: *on factor demand:*	S	NW	NE	C
L	5.07D-03	0.13	0.00	6.02D-03
E	2.37D-03	0.060	0.00	2.81D-03
M	1.34D-04	3.40D-03	0.00	1.59D-04

Center

Spill over effect from region: *on factor demand:*	S	NW	NE	C
L	0.044	0.11	0.015	0.00
E	0.068	0.17	0.024	0.00
M	1.47D-03	3.73D-03	5.14D-04	0.00

South

Spill over effect from region: *on factor demand:*	S	NW	NE	C
L	0.00	-0.22	-0.034	-0.012
E	0.00	-0.022	-3.48D-03	-1.18D-03
M	0.00	-0.022	-3.50D-03	-1.19D-03

Note:
(*) partial elasticities computed from estimated parameters: L= labour demand; E=energy demand; M= materials demand.

Table A8 – Degree of Regulation of Labour Relations and Active Labour Policies

	EMPLOYMENT PROTECTION (1990) (a)	LABOUR STANDARD (1985-1993) (b)	ACTIVE LABOUR MARKET POLICIES (1991) (c)
Australia	4	3	3.2
Austria	16	5	8.3
Belgium	17	4	14.6
Canada	3	2	5.9
Denmark	5	2	10.3
Finland	10	5	16.4
France	14	6	8.8
Germany (W)	15	6	25.7
Italy	20	7	10.3
Japan	8	1	4.3
Netherland	9	5	6.9
N. Zealand	2	3	6.8
Norway	11	5	14.7
Portugal	18	4	18.8
Spain	19	7	4.7
Sweden	13	7	59.3
Switzerland	6	3	8.2
U. K.	7	0	6.4
U.S.A.	1	0	3.0

Sources: (a): OECD Jobs Study (1994), Part II, Table 6.7, Col. 5. Country ranking with 20 as the most strictly regulated.
(b): OECD Employment Outlook (1994), Table 4.8, Col. 6, extended by Nickell – Layard (1997). This is a synthetic index whose maximum value is 10 and refers to labour market standards enforced by legislation on, successively, working time, fixed term contracts, employment protection, minimum wages and employees representation rights. Each of these is scored from 0 (lax or no legislation) to 2 (strict legislation) and the scores are then added up.
(c): OECD Employment Outlook (1995). The variable measures current active labour market spending as % of GDP divided by current unemployment. Expenditure on the disabled is excluded.

Table A9 – Industrial Relations Conflicts (1986-1995)

(annual average of working days not worked per 1,000 employees in all industries and services)

	1986-1990	1991-1995	1986-1995		Ranking 1986-1995	
Australia	224	130	176		Spain	1
Austria	2	6	4		Finland	2
Belgium	(48)	32	(38)		Canada	3
Canada	429	159	292		Italy	4
Denmark	41	45	43		New Zealand	5
Finland	410	218	321		Australia	6
France	111	94	102		France	7
Germany	5	17	12		Norway	8
Italy	315	183	249		Sweden	9
Japan	5	(3)	(4)		U.K.	10
Netherland	13	33	24		U.S.A.	11
N. Zealand	425	55	242		Portugal	12
Norway	142	62	102		Denmark	13
Portugal	82	34	57		Belgium	14
Spain	602	469	534		Netherland	15
Sweden	134	50	94		Germany	16
Switzerland	0	1	1		Austria	17
U. K.	137	24	81		Japan	18
U.S.A.	82	42	62		Switzerland	19
Mean	169	87	128			

Sources: working days not worked: ILO; employees in employment: OECD.

Note: From 1993 data cover the entire Federal Republic of Germany; earlier data represented West Germany only. Brackets indicate averages based on incomplete data.

Table A10 – The Weight of "Labour Tax Wedge"

	1985	1995	Ranking in 1995
Australia	22.9	23.5	Belgium
Austria	40.3	39.7	**Italy**
Belgium	54.2	53.5	Germany
Canada	26.9	31.4	Sweden
Denmark	47.8	45.2	Netherlands
Finland	38.0	39.4	Denmark
France	43.4	43.6	France
Germany	44.5	48.3	Austria
Italy	**50.0**	**49.9**	Spain
Japan	21.6	21.6	Finland
Netherland	49.9	45.6	Norway
N. Zealand	27.9	24.3	Portugal
Norway	41.8	36.9	U.K.
Portugal	30.7	34.3	Canada
Spain	36.6	38.8	U.S.A.
Sweden	50.9	46.8	Switzerland
Switzerland	28.8	28.7	New Zealand
U. K.	37.8	33.3	Australia
U.S.A.	33.6	31.2	**Japan**
Mean	38.3	37.8	

Source: OECD, The Tax / Benefit Position of Production Workers, Paris.

Note: The "Labour Tax Wedge" include (1) all the social contributions (for firm and worker) and (2) the direct income taxation for a single worker. The indirect taxation (e.g. VAT) is excluded.

Table A11 – The Structure of "Labour Tax Wedge": Italy vs. Japan (1996)

	ITALY single worker	JAPAN single worker	ITALY married with two children	JAPAN married with two children
A) Take Home Pay / Total Labour Cost	49.2	80.6	56.2	84.9
B) Take Home Pay / Gross Earnings	72.0	86.3	82.3	91.0
C) Gross Earnings / Total Labour Cost	68.3	93.4	68.3	93.4
D) Average Total Tax Wedge (100 – A)	50.8	19.4	43.8	15.1

Source: OECD, The Tax / Benefit Position of Production Workers, Paris (1997).

Table A12 – Union Density and Bargaining Coverage (1980, 1990 and 1994)

	Union Density			Bargaining Coverage		
	1980	1990	1994	1980	1990	1994
Australia	48 (11)	41 (8)	35 (9)	88 (5)	80 (8)	80 (9)
Austria	56 (6)	46 (6)	42 (6)	*98 (1)*	98 (1)	98 (1)
Belgium	56 (6)	51 (5)	54 (5)	*90 (4)*	90 (4)	90 (5)
Canada	36 (12)	36 (11)	38 (8)	37 (17)	38 (17)	36 (16)
Denmark	76 (2)	71 (3)	76 (3)	*69* (14)	69 (13)	69 (13)
Finland	70 (3)	72 (2)	81 (2)	95 (2)	95 (2)	95 (2)
France	18 (18)	10 (19)	9 (19)	85 (7)	92 (3)	95 (2)
Germany	36 (12)	33 (12)	29 (13)	91 (3)	90 (4)	92 (4)
Italy	49 (10)	39 (9)	39 (7)	85 (7)	83 (7)	82 (7)
Japan	31 (15)	25 (16)	24 (16)	28 (18)	23 (18)	21 (18)
Netherland	35 (14)	26 (15)	26 (15)	76 (9)	71 (12)	81 (8)
N. Zealand	56 (6)	45 (7)	30 (12)	*67* (15)	67 (14)	31 (17)
Norway	57 (5)	56 (4)	58 (4)	*75* (11)	75 (11)	74 (11)
Portugal	61 (4)	32 (13)	32 (11)	70 (12)	79 (9)	71 (12)
Spain	9 (19)	13 (17)	19 (17)	*76* (9)	76 (10)	78 (10)
Sweden	80 (1)	83 (1)	91 (1)	*86* (6)	86 (6)	89 (6)
Switzerland	31 (15)	27 (14)	27 (14)	*53* (16)	53 (15)	50 (14)
U. K.	50 (9)	39 (9)	34 (10)	70 (12)	47 (16)	47 (15)
U.S.A.	22 (17)	16 (17)	16 (18)	26 (19)	18 (19)	18 (19)
Mean	46	40	40	71	70	68

Source: OECD – Employment Outlook (1997) Note: Ranking in bracket.

Table A13 – Degree of Co-ordination and Centralisation of Wage Negotiations

	Degree of Centralisation of Wage Negotiations			Degree of Co-ordination of Wage Negotiations		
	1980	1990	1994	1980	1990	1994
Australia	2+ (3)	2+ (1)	1.5 (14)	2+ (7)	2+ (5)	1.5 (15)
Austria	2+ (3)	2+ (1)	2+ (1)	3 (1)	3 (1)	3 (1)
Belgium	2+ (3)	2+ (1)	2+ (1)	2 (10)	2 (10)	2 (9)
Canada	1 (17)	1 (17)	1 (16)	1 (18)	1 (17)	1 (16)
Denmark	2+ (3)	2 (8)	2 (5)	2.5 (4)	2+ (5)	2+ (6)
Finland	2.5 (2)	2+ (1)	2+ (1)	2+ (7)	2+ (5)	2+ (6)
France	2 (8)	2 (8)	2 (5)	2- (13)	2 (10)	2 (9)
Germany	2 (8)	2 (8)	2 (5)	3 (1)	3 (1)	3 (1)
Italy	2- (15)	2- (14)	2 (5)	1.5 (15)	1.5 (15)	2.5 (4)
Japan	1 (17)	1 (17)	1 (16)	3 (1)	3 (1)	3 (1)
Netherland	2 (8)	2 (8)	2 (5)	2 (10)	2 (10)	2 (9)
N. Zealand	2 (8)	1.5 (16)	1 (16)	1.5 (15)	1 (17)	1 (16)
Norway	2 (8)	2+ (1)	2+ (1)	2.5 (4)	2.5 (4)	2.5 (4)
Portugal	2- (15)	2+ (1)	2 (5)	2- (13)	2 (10)	2 (9)
Spain	2+ (3)	2 (8)	2 (5)	2 (10)	2 (10)	2 (9)
Sweden	3 (1)	2+ (1)	2 (5)	2.5 (4)	2+ (5)	2 (9)
Switzerland	2 (8)	2 (8)	2 (5)	2+ (7)	2+ (5)	2+ (6)
U. K.	2 (8)	2- (14)	1.5 (14)	1.5 (15)	1+ (16)	1 (16)
U.S.A.	1 (17)	1 (17)	1 (16)	1 (18)	1 (17)	1 (16)

Source: OECD – Employment Outlook (1997)

Note: For the degree of centralisation and co-ordination has been assigned a value between 1 (for decentralised / uncoordinated) and 3 (for centralised / co-ordinated). The degree of co-ordination includes both union and employer co-ordination. Ranking in bracket.

Table A14 – Industrial relations structures and procedures: international rankings

	Blyth (1979) (a)	Schmitter (1981) (b)	Cameron (1984) (c)	Lehmbruch (1984) (d)	Bruno – Sachs (1986) (e)	Tarantelli (1986) (f)	Calmfors – Driffill (1988) (g)	Soskice (1990) (h)	Dell' Aringa (1990) (i)	Layard – Nickell - Jackman (1991) (j)
1	Canada	ITALY	Spain	Australia	U.S.A.	ITALY	Canada	U.S.A.	U.S.A.	Canada
2	U.S.A.	U. K.	France	Canada	Canada	U. K.	U.S.A.	U. K.	Canada	N.Zealand
3	ITALY	France	Japan	N. Zealand	Australia	France	Switzerl.	France	ITALY	U. K.
4	U. K.	Canada	U.S.A.	U.S.A.	ITALY	N. Zealand	Japan	ITALY	U.K.	U.S.A.
5	France	U.S.A.	Canada		France	Canada	ITALY	Netherlan.	France	
6	Japan		ITALY	ITALY	U. K.	Belgium	U. K.	Germany	Japan	Australia
7	Netherlan.	Switzerland	Switzerl.	U. K.	N.Zealand	U.S.A.	France	Sweden	Australia	ITALY
8	Belgium	Germany			Japan	Finland	Australia	Norway	Switzerl.	Spain
9	Germany	Belgium	Australia	Belgium	Belgium	Netherlands	N.Zealand	Switzerl.	Belgium	
10	Australia	Netherlands	U. K.	Denmark	Finland	Australia	Belgium	Austria	Netherlan.	Belgium
11	N.Zealand	Denmark	Germany	Finland	Denmark	Norway	Netherlan.	Japan	Germany	France
12	Finland	Finland	Netherlan.	Germany	Switzerl.	Denmark	Germany		Finland	Japan
13	Denmark	Sweden	Denmark	Switzerland	Norway	Sweden	Finland		Denmark	Netherlan.
14	Sweden		Finland		Sweden	Japan	Denmark		Sweden	Switzerl.
15	Norway	Norway	Belgium	Austria	Netherlan.	Germany	Sweden		Norway	
16	Austria	Austria	Austria	Netherlands	Germany	Austria	Norway		Austria	Germany
17			Norway	Norway	Austria		Austria			
18			Sweden	Sweden						Austria
19										Denmark
20				France						Finland
21				Japan						Norway
22										Sweden

Legend:
(a) = Level of bargaining , union and employers' co-operation.
(b) = Organisational centralisation and the number of unions.
(c) = Centralisation of unions, control capacity of central organisation, union membership.
(d) = Influence of unions in the policy formulation process.
(e) = Centralisation of unions, shop-floor representation, employers' co-ordination, existence of work councils.
(f) = Degree of ideological and political consensus of unions and employers, centralisation of bargaining, regulation of industrial conflict.
(g) = Centralisation of unions and employers' organisations.
(h) = Covert and overt co-ordination of unions and employers' associations.
(i) = Degree of centralisation of wage negotiation.
(j) = Unions' plus employers' co-ordination.

Table A 15

Alternative Scenario Simulations 2000-2006

(average percentage differences: scenario vs. baseline)

		SO	NW	NE	CE	IT
	Scenario		*labor demand L*			
1	interest rate reduction: -1%	0,57	0,07	0,11	0,09	0,20
2	Wage rate: -1%	0,53	0,82	0,67	0,60	0,68
3	investment increase: +2.5%	1,69	2,25	1,81	1,29	1,85
4	output increase: + 1%	0,18	0,77	0,46	0,20	0,37
5	factor price reduction -1%	1,08	1,02	0,90	0,79	0,96
	Scenario		*energy demand E*			
1	interest rate reduction: -1%	-0,31	-0,18	-0,59	-0,34	-0,29
2	wage rate: -1%	0,19	1,78	4,01	1,30	1,10
3	investment increase: +2.5%	-0,91	-0,82	-0,82	-0,87	-0,91
4	output increase: + 1%	1,13	3,97	4,36	4,20	2,67
5	factor price reduction -1%	-0,01	1,67	3,71	1,16	0,92
	Scenario		*import demand M*			
1	interest rate reduction: -1%	0,01	0,00	0,00	0,00	0,00
2	wage rate: -1%	-1,59	-0,64	-0,77	-0,97	-0,77
3	investment increase: +2.5%	0,04	0,01	0,00	0,06	0,01
4	output increase: + 1%	0,35	0,16	0,21	0,08	0,18
5	factor price reduction -1%	-1,90	-0,75	-0,90	-1,14	-0,90
	Scenario		*investment I*			
1	interest rate reduction: -1%	0,11	0,01	0,02	0,02	0,04
2	wage rate: -1%	0,04	0,01	0,01	0,01	0,02
3	investment increase: +2.5%	..	..	..	..	..
4	output increase: + 1%	0,07	0,03	0,04	0,02	0,04
5	factor price reduction -1%	0,12	0,01	0,02	0,02	0,05
	Scenario		*optimal capital stock K**			
1	interest rate reduction: -1%	0,24	0,02	0,04	0,05	0,08
2	wage rate: -1%	0,08	0,02	0,01	0,02	0,03
3	investment increase: +2.5%	0,05	-0,01	-0,01	-0,01	0,00
4	output increase: + 1%	-0,16	-0,06	-0,08	-0,03	-0,08
5	factor price reduction -1%	0,26	0,02	0,05	0,05	0,09

Table A 16

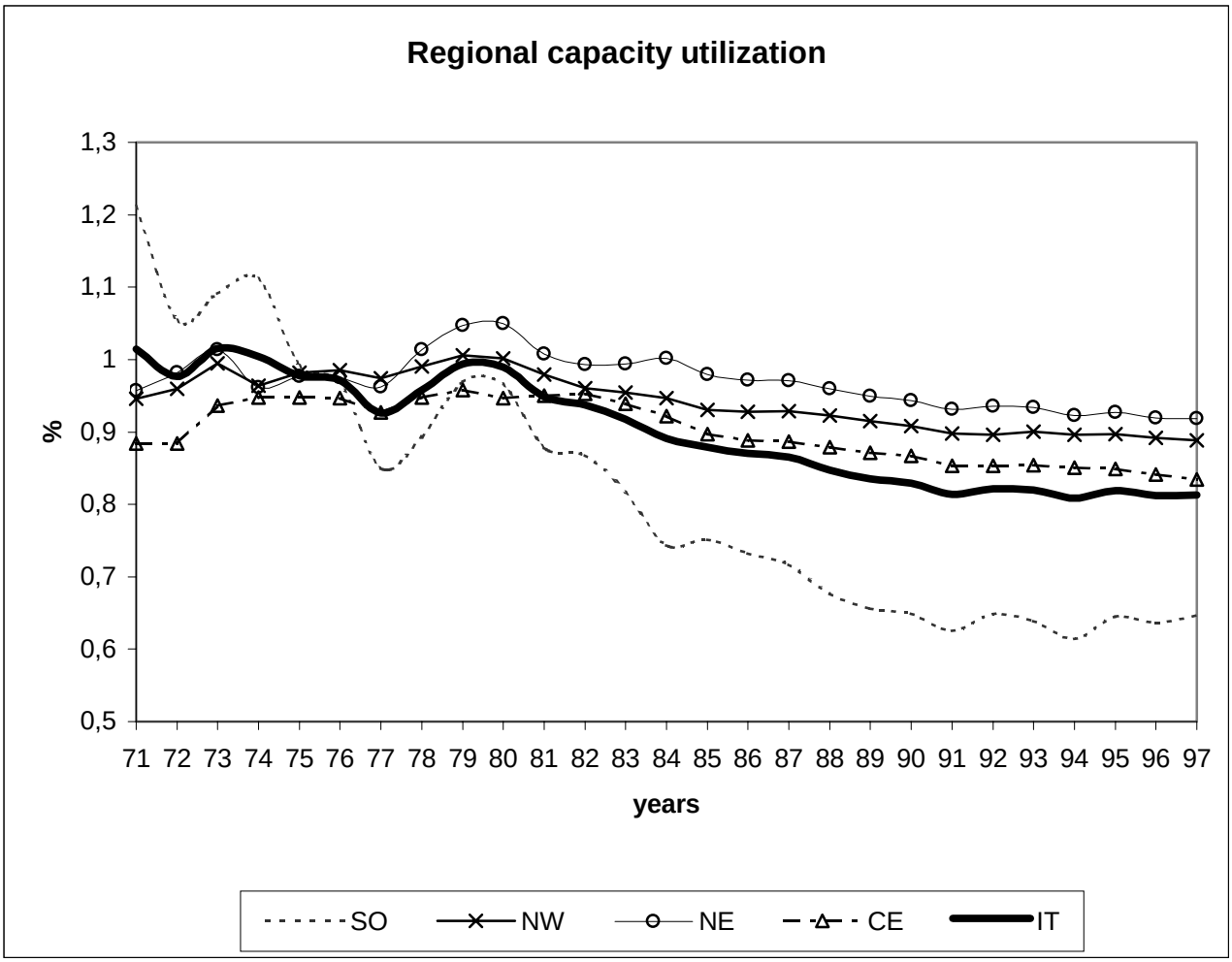
Alternative Scenario Simulations 2000-2006 (PART 2)

Composite Scenarios with interest rate increase +2% due to BCE aggressive policy

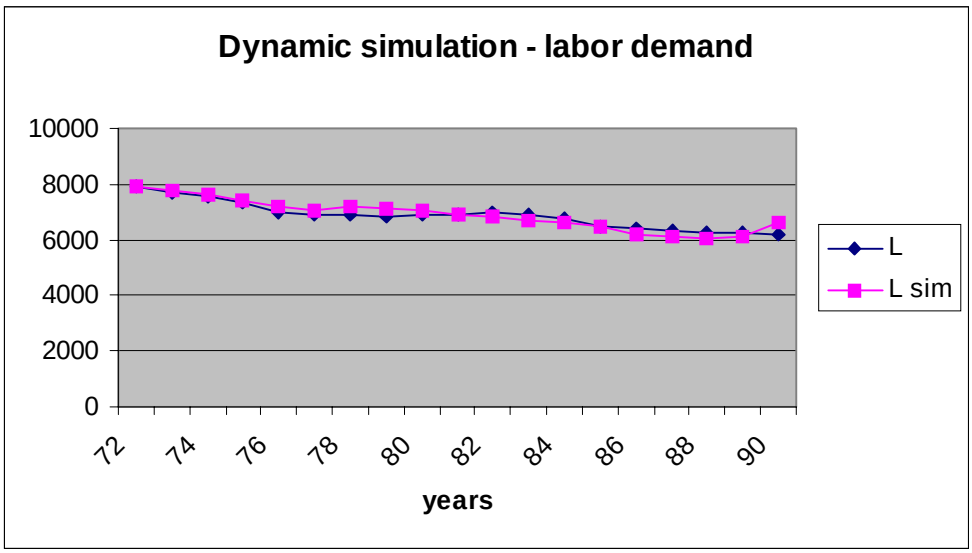
(average percentage differences: scenario vs. baseline)

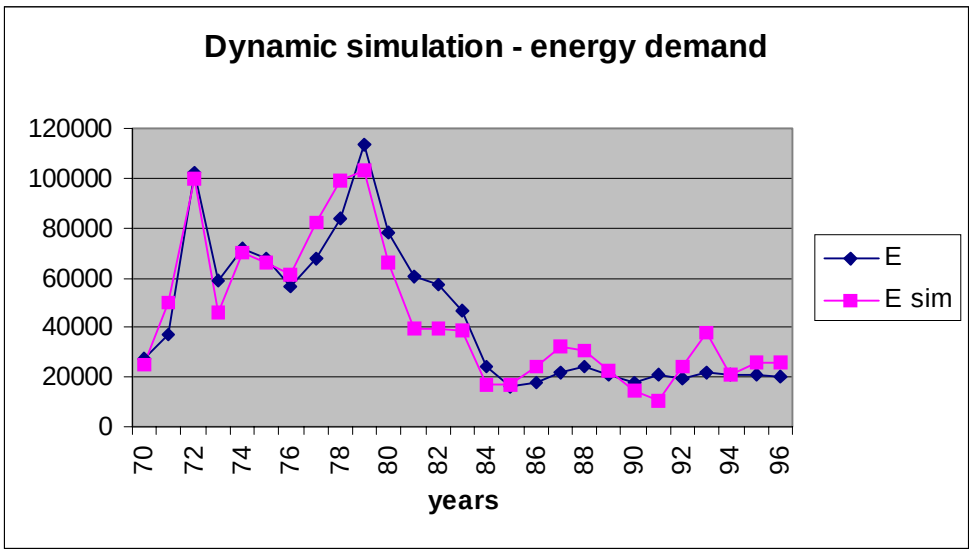
	SO	NW	NE	CE	IT
Scenario		*labor demand L*			
6 wage rate reduction: -0.5% CN and -2.5% S	-0,68	0,28	0,12	0,12	-0,01
7 factor price reduction: -1% CN and -3% S	0,66	0,83	0,58	0,53	0,68
8 factor price reduction: -1% CN and –3% S and further wage reduction: -1% S	1,69	0,83	0,58	0,53	0,93
Scenario		*energy demand E*			
6 wage rate reduction: -0.5% CN and -2.5% S	0,78	1,26	3,15	1,30	1,16
7 factor price reduction: -1% CN and -3% S	0,96	2,13	4,99	2,05	1,75
8 factor price reduction: -1% CN and –3% S and further wage reduction: -1% S	1,31	2,13	4,99	2,05	1,92
Scenario		*import demand M*			
6 wage rate reduction: -0.5% CN and -2.5% S	-1,55	-0,32	-0,38	-0,49	-0,43
7 factor price reduction: -1% CN and -3% S	-4,95	-0,75	-0,90	-1,15	-1,05
8 factor price reduction: -1% CN and –3% S and further wage reduction: -1% S	-9,36	-0,75	-0,90	-1,15	-1,22
Scenario		*investment I*			
6 wage rate reduction: -0.5% CN and -2.5% S	-0,19	-0,02	-0,03	-0,04	-0,07
7 factor price reduction: -1% CN and -3% S	-0,08	-0,02	-0,03	-0,05	-0,04
8 factor price reduction: -1% CN and –3% S and further wage reduction: -1% S	-0,01	-0,02	-0,03	-0,05	-0,02
Scenario		*optimal capital stock K**			
6 wage rate reduction: -0.5% CN and -2.5% S	-0,42	-0,03	-0,08	-0,09	-0,14
7 factor price reduction: -1% CN and -3% S	-0,17	-0,04	-0,07	-0,10	-0,09
8 factor price reduction: -1% CN and –3% S and further wage reduction: -1% S	-0,03	-0,04	-0,07	-0,10	-0,06

Graph A 1


Regional capacity utilization
1,3
1,2
1,1
1
0,9
0,8
0,7
0,6
0,5
%
71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97
years
SO
NW
NE
CE
IT

Graph A 2


Dynamic simulation - labor demand
10000
8000
6000
4000
2000
0
72
74
76
78
80
82
84
86
88
90
years
L
L sim


Dynamic simulation - energy demand
120000
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80000
60000
40000
20000
0
70
72
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76
78
80
82
84
86
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90
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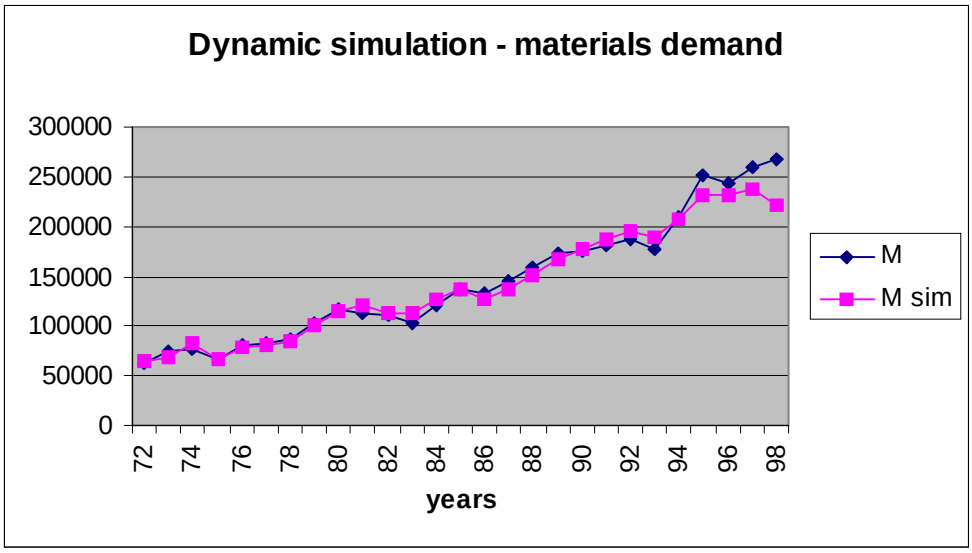
years
E
E sim


Dynamic simulation - materials demand
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250000
200000
150000
100000
50000
0
72
74
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78
80
82
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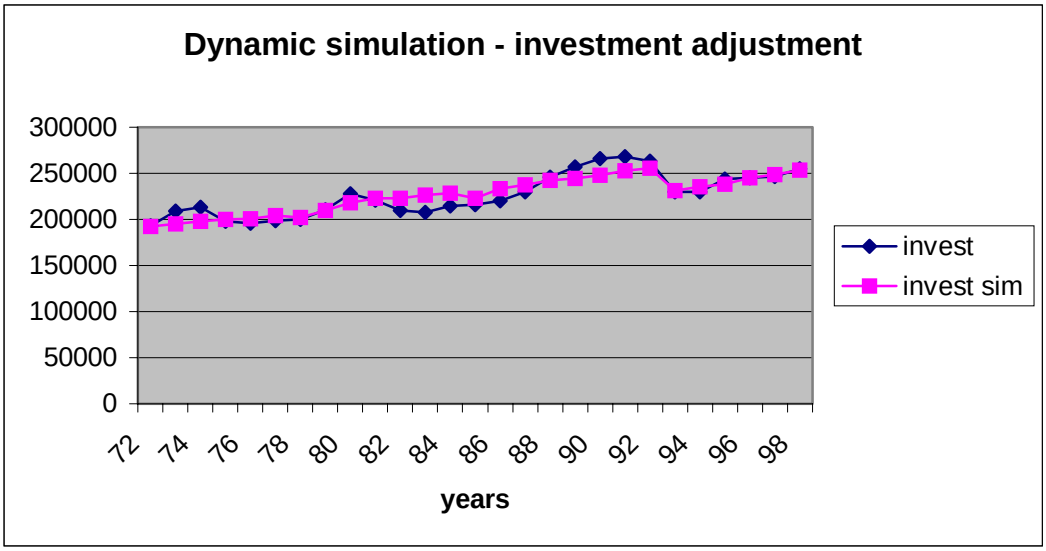
years
M
M sim


Dynamic simulation - investment adjustment
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200000
150000
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74
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78
80
82
84
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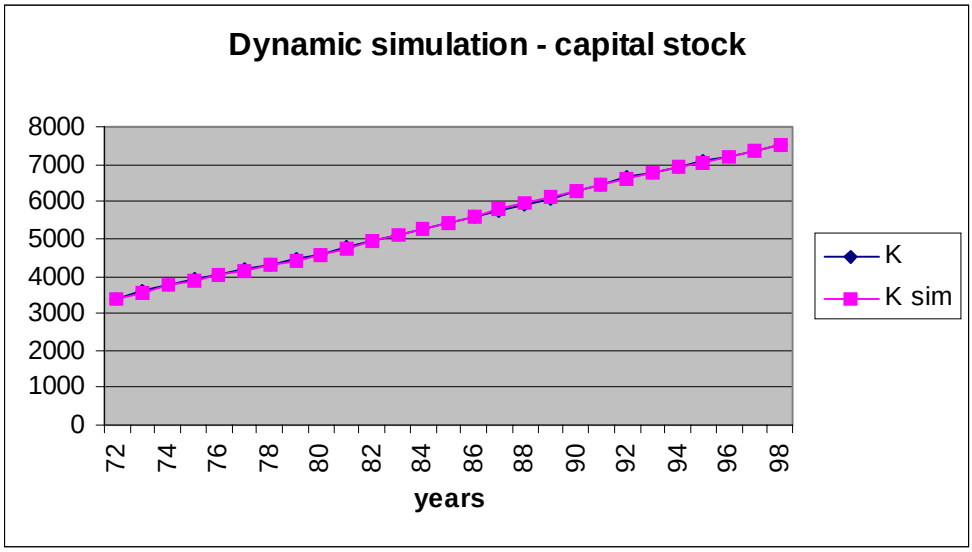
years
invest
invest sim


Dynamic simulation - capital stock
8000
7000
6000
5000
4000
3000
2000
1000
0
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74
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78
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86
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K
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Appendix B

B1: The Model

Formally, the variable cost function, cv(w,y,t,k), defines the minimal cost to attain a given level of output y, given variable factors prices (w, of dimension n x 1), given the level of quasi-fixed factors (k, of dimensions m x 1) and for given technology (indicated from variable t). Shephard's lemma allows to derive the system of variable factors demand, that is

$$x = \partial cv(w,y,t,k)/\partial w \quad (1)$$

where x is the vector (of dimension n x 1) of the employed quantities of variable factors. Given the conditional demands of variable productive factors, the maximization of the profit is obtained equating marginal revenue to marginal cost, that is

$$p = -y\,(\partial d(y)/\partial y) + (\partial cv(w,y,t,k)/\partial y) = [1/(1 + e_{py})]\, cm(w,y,t,k) \quad (2)$$

where d(y) indicates the inverse output demand function facing the enterprise, e_{py} is the elasticity of the demand (inverse) and cm(w,y,t,k) indicates the short run marginal cost. The description of the short run position of equilibrium of the enterprise does not preclude an analysis of the long run position of the same enterprise, where long period means that total costs (variable costs, therefore, and imputed costs to the quasi-fixed factors) are minimized. For a given level of the quasi-fixed factors, the variable cost function is simply the difference between the short period total cost function (ct(w,r,k,t,y)) and the cost of the quasi-fixed factors, that is

$$ct(w,r,k,t,y) = cv(w,k,t,y) + r'k \quad (3)$$

where, r indicates the vector (m x 1) of market prices (ex-ante) of the quasi-fixed factors. Evidently, the long run cost function c(w,r,t,y) can be obtained minimizing total cost (3) with respect to the quasi-fixed factors, given variable factors and output levels. The first order condition is

$$\partial ct(w,r,k,t,y)/\partial k = \partial cv(w,k,t,y)/\partial k + r = 0 \quad (4)$$

or equality between market price r of the fixed factor and its shadow price q, defined as the potential reduction in variable costs consequent to a unitary variation of the fixed factor level

$$q = -\partial cv(w,k,t,y)/\partial k > 0 \quad (5)$$

Define k = k*(w,r,t,y) the solution of (4), that is the vector of "the optimal" amounts of the quasi fixed factors. Substituting k in (3) yields the long run cost function

$$\begin{aligned} ct(w,r,k,t,y) &= cv(w,k,t,y) + r'k \\ &= cv[w,k^*(w,r,t,y),y] + r'k^*(w,r,t,y) \\ &= c(w,r,t,y) \end{aligned} \quad (6)$$

Notice that if constant returns prevail in the long period (and therefore ln cv(w,k,t,y) / ln y + ι' [ln cv(w,k,t,y)] / ln k)=1 for an appropriated unitary vector ι) and output price equals marginal cost of production (p = cv(w,k,t,y) / y), is possible to attribute entirely the difference between the value of the production and the variable costs to the remuneration of the quasi-fixed factors

$$q'k = p\,y - cv(w,k,t,y) \quad (7)$$

In particular, in presence of a single quasi fixed factor (capital stock), its ex-post shadow price q is given simply by the gross operating margin per unit of capital, i.e. the difference between value added and labor compensations.

Generalizing the analysis to the non constant returns and/or monopolistic competition cases, we can follow Morrison (1989, 1990) in order to obtain the relationship revenues / costs as function of the characteristic elasticities:

$$py / ct (w,r,k,t,y) = e_{cy} (1 - e_{cK}) / (1 + e_{py}) \qquad (8)$$

where $e_{cy} = \ln c(w,r,t,y) / \ln y$ (the elasticity of long run costs to output) measures the reciprocal of scale returns, $e_{ck} = (r - q)' k / c(w,r,k,t,y)$ measures utilized capacity fluctuations deriving from the presence of fixed factors, and finally e_{py} (the elasticity of the inverse demand) measures the dependence of revenues from demand factors. Evidently, if long run scale returns are constant, then $e_{cy} = 1$. Moreover, if perfect competition prevails, i.e. $e_{py} = 0$, then (8) reduces to (7), with only one fixed factor.
The empirical application, with only one quasi-fixed factor, entails the estimation of a Generalized-Leontief (GL) function due to Diewert (1971) and applied by Morrison (1988), in a regional context by Morrison-Schwartz (1996) and, in the Italian case, among others, by Heimler (1990) and Atella and Quintieri (1995).
Notice that the GL allows explicit solution for the restricted and unrestricted cost function, unlike the translog, which admits, in fact, only numerical solution (Brown and Christensen 1981, Berndt and Wood 1984, Berndt and Hesse 1986, Heimler and Milana 1988).
The GL with one fixed factor is

$$\begin{aligned} cv(w,k,t,b,y) \quad &= y [\alpha_o + \Sigma_i\Sigma_j \alpha_{ij} w_i^{½} w_j^{½} + \Sigma_i \mu_{it} w_i t^{½} + \Sigma_i\mu_{iy} w_i y^{½} + \Sigma_i\mu_{ib} w_i b^{½} \\ &+ \Sigma_i w_i (\phi_{tt} t + \phi_{yy} y + \phi_{bb} b + \phi_{ty} t^{½} y^{½} + \phi_{tb} t^{½} b^{½} + \phi_{by} b^{½} y^{½})] \\ &+ y^{½} [\Sigma_i\mu_{ik} w_i k^{½} + \Sigma_i w_i (\phi_{tk} t^{½} k^{½} + \phi_{yk} y^{½} k^{½} + \phi_{bk} b^{½} k^{½}] + \Sigma_i w_i \phi_{kk} k \end{aligned} \qquad (9)$$

where t it is a time trend that approximates the technological progress, b indicates the gross fixed investments that approximate the existence of adjustment costs, and α, μ, ϕ are technological parameters. From (9) it can immediately be derived the production coefficients of variable factors, that is

$$\begin{aligned} x_i / y \quad &= (\partial cv(w,y,t,b,k) / \partial w_i) (1/y) \\ &= \Sigma_j \alpha_{ij} (w_j / w_i)^{½} + \mu_{it} t^{½} + \mu_{iy} y^{½} + \mu_{ib} b^{½} + \phi_{tt} t + \phi_{yy} y + \phi_{bb} b + \phi_{ty} t^{½} y^{½} + \phi_{tb} t^{½} b^{½} \\ &+ \phi_{by} b^{½} y^{½} + \mu_{ik} (k/y)^{½} + \phi_{tk} (tk/y)^{½} + \phi_{yk} k^{½} + \phi_{bk} (bk/y)^{½} + \phi_{kk} (k/y) \end{aligned} \qquad (10)$$

and the envelope condition, that is the condition of equality between market price (ex-ante) of the fixed factor and its shadow price (ex-post)

$$\begin{aligned} r = q \quad &= -\partial cv(w,k,t,b,y) / \partial k \\ &= -\{\Sigma_i w_i \phi_{kk} + ½ (y/k)^{½} [\Sigma_i \mu_{ik} w_i + \Sigma_i w_i (\phi_{tk} t^{½} + \phi_{yk} y^{½} + \phi_{bk} b^{½})]\} \end{aligned} \qquad (11)$$

As it is obvious, (9) is homogenous of degree one in variable factors prices and therefore demand system (10) turns out to be homogenous of degree zero. From (11) it is possible to derive the stationary state and the desired stock of the fixed factor. Imposing the tangent condition between short and long run cost curves and therefore imposing the equality between q and r and solving for k yields

$$\begin{aligned} k = \quad & k^*(w,r,t,b,y) \\ = \quad & \{-½ y^{½} [\Sigma_i \mu_{ik} w_i + \Sigma_i w_i (\phi_{tk} t^{½} + \phi_{yk} y^{½} + \phi_{bk} b^{½})] / (r + \Sigma_i w_i \phi_{kk})\}^2 \end{aligned} \qquad (12)$$

Notice that (12) is homogenous of degree zero in prices, as requested. Moreover, if $\phi_{kk} > 0$, the long run elasticity of capital with respect to p_k is negative and therefore the curvature condition is satisfied. The convexity condition regarding k ($(\partial^2 cv(w,k,y) / \partial k^2 > 0$) is satisfied if the terms μ_{ik} are not all positive, that would imply a complementary of the fixed factor with respect to all the others input.

B2: The Data (definitions and sources)

"Extended" value added of the industrial sector
The value added of the production of the industrial sector at current prices is defined as the sum of the value added at factor cost and of the value of the imports of goods, distinguished in energy and materials. The value of the production at constant prices therefore is obtained deflating the correspondent series at current prices using the appropriate deflators.
The constant prices have base=1990. Sources: Golinelli and Monterastelli (1990), ISCO, ISTAT - regional accounts (file: regio96, web site: www.istat.it) and Berrettoni et al. (1995 and 1999).

Labor
The factor labor is measured in unit of employed and independent workers as reported by Istat. Cfr. also Berrettoni et al. (1995 and 1999).

Labor cost
The labor cost is measured as total labor income (employed and self-employed) divided by units of labor (employed and self-employed). Labor income for employed is reported by Istat. Self-employed labor income is constructed using also the Bank of Italy Survey which provides information on the ratio of dependent to independent labor income. Sources: Golinelli - Monterastelli (1990), Bank of Italy, Supplement to Statistical Bullettin, various years and Berrettoni et al. (1995 and 1999).

Stock of capital
The capital stock is measured in terms of stock at constant prices, measured by Istat at the national level and reconstructed on regional basis using the optimal econometric method Bollino (1994 and 1998). Notice that this method uses efficiently all the information available and it is not a simple regional apportionment of the total national stock, as it is done by others, e.g.: Morrison Schwartz (1996) and Ministero tesoro (1999).
The capital stock data does not exist in Italy at the regional level. The new capital stock data has been constructed here for the first time for the 20 Italian regions from the year 1951-1996, using a four step procedure. In the first step, a homogeneous time series of national capital stock, for constructions and machinery separately, at constant 1990 prices was reconstructed using Istat data available only from 1980 to 1995 and using previously available data for the period 1951-1980 from Confindustria sources. In the second step a perpetual inventory method was applied to fixed investment, separately for machinery and construction, for the 20 Regions in the period 1951-1995, in order to obtain a preliminary indicator of the regional capital stock. The initial value of the stock for the year 1951 was calibrated to add up to the national total stock, using fixed investment regional shares for the three year average 1951-1953. The depreciation rate has been computed for each region using the implicit depreciaton series for each sector at the national level (solving for δ the identity $K_t=I_t + (1- \delta)K_{t-1}$) averaged with sectoral investment weights. In the third step the optimal econometric method Bollino (1998) was applied to regress the capital stock on the indicator, in the period 1951-1995, in order to obtain estimated series at the regional level, which are coherent with the national series. The method is optimal in the sense that uses efficiently the information available, with an autoregressive structure common to all regions and a heteroskedastic structure at the regional level. In the fourth step, the 1996 data was updated with new investment data, since Istat has not released 1996 capital stock for that year.

User Cost (ex-ante) of the capital stock in the industrial sector
It is defined by the usual following formula: $p_k = p_i (r + \delta - \pi)$, where p_k, is user cost of capital, r is the rate of return of the capital stock, δ is the rate of depreciation (coherent with the above computation of the capital stock) applicable to the capital good, p_i is the purchase price of capital goods and π is the expected change of price, including a risk premium.
In the regional computations, p_i is the deflator of the gross fixed investments of the industrial sector while the expected real interest rate $(r - \pi)$ has been obtained fitting an autoregressive model of the first order, being annual data. Finally, r has been approximated with the interest rate on the long term Treasury Bonds.
Imports of material inputs and energy and relative implicit prices
For the imports of goods and services and the relative deflators reference has been made to Golinelli - Monterastelli (1990) and Istat data. The regionalization with the optimal econometric method Bollino (1994 and 1998) is described in Berrettoni et al. (1995 and 1999).

Table B1 Industrial Sector, input output data

Labour/Output Ratio

	North-west	North-east	Center	South
1970	0,021	0,036	0,026	0,037
1980	0,015	0,023	0,016	0,029
1985	0,013	0,017	0,017	0,019
1990	0,01	0,014	0,013	0,016
1995	0,007	0,010	0,010	0,014
1999	0,007	0,009	0,009	0,014

Energy/Output Ratio

	North-west	North-east	Center	South
1970	0,23	0,037	0,22	0,15
1980	0,12	0,011	0,26	0,022
1985	0,06	0,051	0,065	0,24
1990	0,062	0,032	0,094	0,21
1995	0,021	0,02	0,023	0,11
1999	0,018	0,01	0,020	0,10

Imported materials/Output Ratio

	North-west	North-east	Center	South
1970	0,23	0,18	0,2	0,12
1980	0,34	0,19	0,22	0,16
1985	0,36	0,28	0,29	0,15
1990	0,40	0,33	0,32	0,17
1995	0,45	0,36	0,35	0,14
1999	0,47	0,38	0,37	0,16

Capital/Output Ratio

	North-west		North-east		Center		South	
	mach.	*total*	*mach.*	*total*	*mach.*	*total*	*mach.*	*total*
1980	1.13	4.85	0.77	3.81	0.69	3.31	0.81	5.32
1985	1.29	5.21	0.94	4.34	0.87	3.62	0.96	5.72
1990	1.38	5.10	1.03	4.35	1.00	3.73	1.04	5.82
1995	1.52	5.44	1.10	4.48	1.21	4.08	1.18	6.25
1999	1.55	5.52	1.12	4.56	1.23	4.01	1.22	6.35

Table B2 Industrial Sector, price data

(annual average percentage change)

Output price

	North-west	North-east	Centre	South
1970-74	0,15	0,11	0,11	0,13
1975-79	0,11	0,10	0,18	0,14
1980-84	0,11	0,11	0,12	0,12
1985-89	0,02	0,03	0,02	0,002
1990-95	0,004	0,007	0,01	0,01
1996-99	0,014	0,013	0,013	0,019

Cost of labour

	Northwest	Northeast	Centre	South
1970-74	0,13	0,15	0,14	0,16
1975-79	0,15	0,17	0,16	0,14
1980-84	0,14	0,14	0,14	0,13
1985-89	0,04	0,04	0,05	0,05
1990-95	0,04	0,04	0,04	0,03
1996-99	0,01	0,01	0,01	0,02

Energy Price

	Northwest	Northeast	Centre	South
1970-74	0,38	0,38	0,38	0,38
1975-79	0,14	0,14	0,14	0,14
1980-84	0,14	0,14	0,14	0,14
1985-89	-0,13	-0,13	-0,13	-0,13
1990-95	0,07	0,07	0,07	0,07
1996-99	0,14	0,14	0,14	0,13

Raw materials price

	North-west	North-east	Centre	South
1970-74	0,13	0,15	0,15	0,15
1975-79	0,13	0,12	0,13	0,11
1980-84	0,10	0,10	0,10	0,10
1985-89	0,02	0,02	0,02	0,01
1990-95	0,02	0,02	0,02	0,02
1996-99	0,04	0,04	0,04	0,03

Capital goods price

	Northwest	Northeast	Centre	South
1970-74	0,12	0,12	0,12	0,10
1975-79	0,13	0,13	0,13	0,13
1980-84	0,11	0,11	0,11	0,11
1985-89	0,03	0,04	0,03	0,03
1990-95	0,01	0,009	0,01	0,01
1996-99	0,02	0,02	0,01	0,01