Intersectoral labour reallocations and unemployment in Italy

Paolo Garonna a,b,*, Francesca G.M. Sica c,1

a Statistical Division of the United Nations ECE, 1202 Geneva, Switzerland
b University of Padua, Padua, Italy
c Department of Macroeconomics Analysis, Labour Market Unit, Institute for Studies and Economic Analyses (ISAE), Rome, Italy

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Abstract

The Italian labour market, like most European labour markets and unlike the US, shows a greater cyclical sensitivity of the service sector with respect to manufacturing and firing costs higher than hiring costs. This accounts for the negative relationship between sectoral employment shifts and Italian unemployment in the post-war period and, correspondingly, for the pro-cyclical pattern of the Lilien index, in contrast with the US experience.

By applying the Lilien index to the Italian context, this paper analyses the relative importance of sectoral regional and national factors in the explanation of changes in industrial structure, and their impact on unemployment. The econometric exercise illustrates that, given the structural features of the Italian labour market, the decline in intersectoral and interregional labour reallocations has significantly contributed to the increase of unemployment in Italy. New hires, the pull of new sectors, sectoral shifts and regional mobility can keep unemployment down, while at the same time maintaining some of the structural features of the “European model” (high employment security and stability).

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* Corresponding author, Statistical Division of the United Nations (ECE), 1202 Geneva, Switzerland. Tel.: +41-22-917-4144; fax: +41-22-917-0040.
E-mail addresses: paolo.garonna@unece.org (P. Garonna), f.sica@isae.it (F.G.M. Sica).
1 Tel.: +39-6-4448-2347; fax: +39-6-4448-2219

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1. Introduction

The Italian labour market is undergoing a profound transformation in its capacity to respond to and accommodate structural change. In the post-war period, the two major waves of (a) rapid industrialisation, accompanied by massive agricultural exodus in the 1950s and 1960s, and (b) tertiarization accompanied by a fundamental restructuring of mass manufacturing in the 1970s and 1980s were supported by particular mechanisms of labour flexibility derived from specific traditional and institutional arrangements. The ensuing responsiveness permitted a substantial increase in aggregate employment consistent with productivity growth and competitiveness.

In the early 1990s, however, a structural breakdown took place in the flexibility patterns of the Italian labour market. Services and the small firms sectors were hit by an unprecedented structural shock, which has not yet been matched by an appropriate adjustment of the policy environment. Employment declined sharply and unemployment hit record levels, particularly in certain parts of the South in the context of a severe recession. The subsequent upturn based on a strong export-led recovery has not been capable of sustaining a sufficient development of domestic demand, incomes and employment.

We claim that the explosion of unemployment in the 1990s is due to the erosion of the conventional sources of industrial flexibility in Italy. If one compares (Fig. 1) the pattern of intersectoral labour reallocation, as measured by the Lilien index, with the dynamics of unemployment from the 1950s through the 1990s, an interesting correspondence appears. In particular, it will be shown that there is a statistically significant negative correlation between unemployment and sectoral shifts of the labour force.

The relationship between unemployment and the dispersion of employment growth rates across different sectors and regions has been widely studied in the literature, following the path-breaking contribution of Lilien (1982). We have tested the validity of the Lilien hypothesis for the Italian labour market and compared it with the US. The objective is to measure the relative importance of sectorial, regional and national factors in the explanation of the evolution of industry structure, and its impact on unemployment. We will show that sectoral dynamics and regional reallocations account for a great deal of the pattern of unemployment variation in Italy in the last decades. The “Lilien hypothesis” therefore appears to hold for Italy. However, the sign of the relationship is opposite to that predicted by Lilien and others, showing a different mechanism at play in Italy in relation to the US. In particular, sectoral and interregional reallocations in Italy reduce unemployment, rather than increasing it. This calls for a discussion of the policy and labour flexibility mechanisms underlying the operation of the labour market in Italy and Europe, as opposed to the US.

We will show that the critical differences with the US are in the lower cyclical sensitivity of manufacturing employment vis-à-vis the services in Europe, and the
fact that firing costs exceed hiring costs. In these conditions, unemployment can be kept at low levels only through major intersectoral and interregional shifts of the labour force. This has been indeed the experience of Italy in the 1950s and 1960s.

Fig. 1. The relationship between sectoral labour reallocations and unemployment in Italy (1952–1994).
The 1990s have marked the apex of a process of discontinuous but significant modernisation of the Italian labour market and society, in pursuit of the goal of greater European harmonisation. The “Europeisation” of the Italian labour market has entailed the abandonment of a few conventional sources of “flexibility”, such as the informal economy, the very small firms and recurrent devaluations of the exchange rate (see Garonna and Sica, 1997; Garonna and Gennari, 1995). It introduced more flexible policy and institutional mechanisms such as the deindexation of wages and temporary employment contracts. However, such changes have not fundamentally affected the two above-mentioned conditions prevailing in Europe of low cyclical responsiveness of industrial employment and high firing costs, while the traditional mechanisms permitting high levels of employment shifts among sectors and regions were gradually eroded. The increase in unemployment can be interpreted then as resulting from the various structural factors governing the intersectoral and interregional adjustments of the employment structure in the process of greater European integration of the Italian economy and society.

The 1990s saw on one hand the end of the Italian specificity in Europe, but on the other hand, the emergence of the “European decease” in Italy. Institutional reforms in fact did not eliminate rigidities characterising the Italian and European labour markets, in particular, those affecting the cyclical responsiveness of employment, such as for instance the highly centralised wage bargaining structure or the lack of an effective safety net or welfare-to-work mechanism, and the regulation of hiring and firing. If Europe and Italy intend to maintain their “model” of employment stability along the cycle and high firing costs, conditions will have to be created for greater intersectoral and interregional labour mobility. By “Americanising” its employment shifting capacity, the European labour market can prevent “Americanising” the conditions of the employment contract. The case of Italy shows that if, and to the extent that, these conditions are not met, structural unemployment inevitably grows.

2. Sectoral shifts, aggregate shocks and the rise in unemployment

Linking employment trends in specific sectors with general macroeconomic conditions has traditionally been an area of policy discussion and controversy. Recently, attention has been focused on the relationship between intersectoral employment variations and aggregate unemployment dynamics. Sectoral patterns are, in fact, an essential component of labour market equilibrium and change. Labour market performance is crucially dependent upon the capacity of expanding sectors to: (1) attract human resources from declining sectors; (2) activate the desired rate and type of interoccupational and territorial mobility; and, (3) sustain the appropriate structure of earnings differentials and employment contracts. High sectoral variability in labour demand may determine frictions and adjustment costs.
leading to an increase in unemployment. Lilien in his seminal paper (Lilien, 1982) claimed that as much as half of the cyclical variations in US unemployment were due to structural shifts in the sectorial composition of labour demand. On the other hand, high variability may: (1) facilitate adjustment to ever increasing changes in technology and consumer preferences; (2) promote skill enrichment and employability; and, (3) induce cross-fertilization of experiences and institutional reform.

Following Lucas and Prescott (1974), Barro (1977) and Lilien (1982), the economic literature has tested the relationship between unemployment and the dispersion of sectoral employment trends, the so-called Lilien index. Interesting theoretical developments have emerged: (a) aggregate demand shocks can also work through different sectors, therefore explaining, at least in part, the relationship between unemployment and employment variability (Abraham and Katz, 1986); (b) sectoral variations can be anticipated on the basis of aggregate demand pressure or not anticipated when due to structural shifts at the sectorial level; therefore, the Lilien index can be decomposed into a predicted and a non-predicted element (Neelin, 1987); and, (c) empirical analysis has in many cases confirmed the existence of a significant Lilien effect on unemployment, i.e. a positive relationship between unemployment and sectoral labour reallocations. It has, however, shown that endogenous industry shifts, i.e. shifts correlated with economic activity, also play an important part in explaining unemployment fluctuations. In short, the issue of whether sectoral shifts or aggregate shocks are explanatory factors, along with their relative importance and positive or negative impact on unemployment are empirical questions to be tested against available evidence.

In theory, the relationship between the variability of the industrial structure, as measured by the Lilien index $\sigma$, and the rate of unemployment, depends on the following set of factors: (1) the extent to which sectors differ in their trend rates of growth; (2) different sensitivity of various sectors vis-à-vis aggregate demand variations; and, (3) the degree of labour force homogeneity, mobility and labour market imperfection.

It is worth noting that in the literature, conditions under (3) are conventionally labeled “structural”, and opposed to conditions under (1) and (2), qualified as “aggregate demand”. In reality, structural and institutional factors are at play in all three sets of factors. Besides, both aggregate demand and structural factors evolve through time and may vary in different contexts. It is undeniable, however, that demand pressure cannot be considered unimportant in the working of the labour market and the evolution of industry composition of employment.

### 3. Industries’ growth rates and cyclical sensitivities

It can be shown that if there is a negative (positive) correlation between industries’ trend rates of growth and their cyclical sensitivities, this alone is
sufficient to produce a positive (negative) correlation between \( \sigma_t \) and unemployment.

In the case of USA, Abraham and Katz (1986) showed that manufacturing employment grows less rapidly, but reacts more to the business cycle, while services grow more but with a minor cyclical sensitivity. We would then expect \( \sigma_t \) to move anti-cyclically in the US, and, indeed, many studies of North American labour markets have proved this to be the case (see Abraham and Katz, 1986; Neelin, 1987).

Even if differences in industry growth rates are unimportant, different sensitivities in relation to the cycle generate a positive correlation between \( \sigma_t \) and unemployment. Weiss (1984) showed that this is the case if hiring costs exceed firing costs, i.e. if firms find it easier to reduce employment rapidly than to increase employment rapidly, which is what takes place in the US. Even if aggregate demand were to remain stable, frictions and barriers in the labour market prevent an exact and instantaneous matching between employment losses in contracting firms and gains in expanding firms. Therefore, it is expected that higher \( \sigma_t \) corresponds to higher unemployment rates.

Thus, predictions based on an analysis of all three sets of factors indicate for the US and North America, a positive correlation between \( \sigma_t \) and the rate of unemployment, which is what empirical analysis has consistently shown (Abraham and Katz, 1986; Neelin, 1987).

What can we say instead of the Italian labour market? Let us model it by considering a two-sector economy where sector 1 is services and sector 2 is manufacturing. Service employment is assumed to grow at a more rapid trend rate than manufacturing, and furthermore, to be more responsive to cyclical movements in gross national product (GNP). We can formalize these assumptions by the following two-equation model:

\[
\ln E_{1t} = c + \Gamma_1 t + \gamma_1 (\ln Y_t - \ln Y^*_t) \\
\ln E_{2t} = c + \Gamma_2 t + \gamma_2 (\ln Y_t - \ln Y^*_t)
\]

where 1 and 2 denote the service and manufacturing sector, respectively, and \( E_1 \) and \( E_2 \) are employment in the two sectors; \( Y_t \) is actual GNP and \( Y^*_t \) is trend GNP obtained by applying the Hodrick-Prescott filter; \( \Gamma_1 \) and \( \Gamma_2 \) are the average growth rates of sectoral employment with \( \Gamma_1 > \Gamma_2 \); \( \gamma_1 \) and \( \gamma_2 \) represent the responsiveness of sectoral employment to fluctuations in GNP with \( \gamma_1 > \gamma_2 \) (see Table 1, where DEVPIL express cyclical variations of output around its trend).

Using sectoral employment growth rates and sectoral shares in total employment, we can construct a series of Lilien index, \( \sigma_t \), based on the dispersion in the rate of growth of employment across the two sectors:

\[
\sigma_t = \left[ \frac{E_{1t}}{E_t} (\Delta \ln E_{1t} - \Delta \ln E_t)^2 + \frac{E_{2t}}{E_t} (\Delta \ln E_{2t} - \Delta \ln E_t)^2 \right]^{1/2}.
\]
On the basis of the coefficients $\Gamma_1$, $\Gamma_2$, $\gamma_1$, $\gamma_2$ and of actual and trend rates of GNP growth, we can approximate $\sigma_t$ as follows:

$$
\sigma_t = \left[ 1/2(\Gamma_1 - \Gamma_2) + 1/2(\gamma_1 - \gamma_2)(\Delta \ln Y_t - \Delta \ln Y_t^*) \right].
$$

The values of the coefficients enable us to determine in theory how $\sigma_t$ moves over the business cycle:

$$
\begin{cases} 
\sigma_t \uparrow & \text{if } \Delta \ln Y_t > \Delta \ln Y_t^* \\
\sigma_t \downarrow & \text{if } \Delta \ln Y_t < \Delta \ln Y_t^*
\end{cases}
$$

(4)

Thus, if service employment is, as we assumed, more responsive to cyclical movements in GNP than manufacturing, the second term in the approximate formula for $\sigma_t$ is positive (negative) when the actual rate of GNP growth exceeds (falls short of) the trend rate of GNP growth, so that the value of $\sigma_t$ increases during upturns and decreases during downturns in the economy.

We now proceed to test the model using Italian yearly data from 1951 to 1994. Following the theoretical discussion and empirical evidence on “deindustrialization” in Italy, a broken trend has been fitted to the series of employment in industry; an increasing logarithmic trend up to 1980, and a decreasing linear one afterwards. For services employment, a linear trend was used for the whole period.
but a step dummy was introduced from 1981 onwards to account for a shift in the pattern, which corresponds to the “sponge” function played by services in relation to the industrial employment shake-out (Garonna, 1994).

The model specification is based on our understanding of the patterns of employment growth in Italy in the different sectors and on empirical evidence reflecting these patterns. In particular, industrial employment followed two distinct and different patterns, in relation to the two phases of industrialisation in the 1950s, 1960s and 1970s, and deindustrialisation in the following period. Therefore, in order to reproduce econometrically the industrial employment series, we regressed the actual series on a broken trend. Precisely, we fit an increasing logarithmic trend from 1951 to 1980 (lt5180) because in this period, the growth rate of employment is exponential corresponding to the phase of sustained industrialisation in Italy, and a decreasing linear trend from 1981 to 1994 (t8194) justified by the fact that throughout this period, industrial employment decreased at a constant rate corresponding to the deindustrialisation phase. Finally, a step dummy was included for the period 1981±1993 to account for the downward shift of the employment level, corresponding to the process of employment expulsion from manufacturing towards the tertiary. The existence of a broken trend is confirmed by the estimated coefficient’s sign, positive for lt5180 and negative for t8194; as expected, the step dummy has a negative coefficient.

To describe the employment series in the service sector, we introduced a linear trend for the whole period. Actual series are in fact always increasing in the whole period. The process of terziarization of the Italian economy has proceeded following a continuous pattern in the post-war period. Growth in service employment, however, was affected by the industrial shake-out in the 1980s; the inclusion of a step dummy for the period 1981–1993 is justified by the “sponge” function which services had to play in relation to the release of surplus labour from the large industrial firms. As expected, the dummy has a positive sign.

In both regressions, we introduced also a cyclical indicator, represented by DEVPIL, i.e. the difference between the actual and the trend growth rate of GDP.

The year 1980 represents a crucial year for understanding the patterns of employment growth in Italy. Three main institutional factors account for this year marking the shift from industrialisation to deindustrialisation: (1) In 1980, there was a strike of middlemanagers in Turin (cadre), the so-called “march of the 40,000”, which marked the defeat of the labour unions, and the passage to a different phase of industrial relations, characterised by softer and less antagonistic aptitudes, and therefore, the end of the resistance to lay-offs and dismissals. (2) Legislation and practices concerning Cassa Integrazione Guadagni, a subsidy scheme for lay-offs and short-time working, were enhanced. This made it possible to shake out labour from large industrial firms. (3) There was a change in monetary policy due to the political decision to link the exchange rate at the European level (the snake). This marked a change in expectations and orientation of both Government and business, by making the competitiveness constraints more
binding for enterprises, namely large industrial firms. While they were used to recurrent exchange rate adjustment in the past and accommodating monetary policy, they knew that these patterns could not go on, and they had to put their house in order.

The post-1980 dummy and the break in the trends in this year are justified by these institutional factors, which correspond to a change in the labour market climate and in the employment model.

We checked the sensitivity of the main results to alternative assumptions. In particular, we tested the following alternative specifications of the model:

1. regression of the cyclical component of the employment series (original series minus the trend component obtained from the Hodrick–Prescott filter) for both industry and services on a constant and DEVPIL;
2. regression of the employment series in logarithmic terms on a constant and the trend component obtained by the Hodrick–Prescott filter and DEVPIL.

Both specifications gave about the same absolute value and the same sign for the coefficient of the cyclical elasticity of employment (DEVPIL) as the adopted model. This shows that the current specification can be considered sufficiently robust.

The estimated coefficients of the trends are highly significant at any significance level and show the expected sign. The coefficient of cyclical sensitivity of industry is negative, but not significant. The estimated one for services is positive and significant at the 10% significance level, as are all other coefficients (see Table 1).

The empirical test of the model then confirms that in Italy, the responsiveness of services employment to GDP fluctuations is higher than that of industrial employment, and therefore $\gamma_1 - \gamma_2$ is positive. This is a major difference characterizing the Italian and European labour markets vs. the North American ones, and accounting for an expected negative correlation between $\sigma_t$ and unemployment. The breakdown of the series (see Table 2) shows that the sectors having greater cyclical sensitivity are those characterized by small firms or by greater exposure to international competition. This is the case with means of transport, mechanical equipment, chemicals, metals, rubber, etc. In the other sectors, employment protection legislation, sheltered product market conditions, subsidized lay-off programmes and other institutional arrangements reduce the cyclical responsiveness of employment variations. This is the case, for instance, with the highly regulated distributive trade sector, but is also true of “other manufacturing”.

In Italy, therefore, the dynamic job-creating sectors are on the whole more sensitive to cyclical pressures; which explains why we would expect that a higher variability of employment, reflecting greater flexibility and adjustment, be capable of absorbing supply and demand shocks and moderating unemployment.
Table 2
The elasticity of employment growth with respect to cyclical GDP fluctuations

<table>
<thead>
<tr>
<th>Branches</th>
<th>Elasticities</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>0.21</td>
<td>2.1</td>
</tr>
<tr>
<td>Ferrous and non-ferrous metals</td>
<td>0.37</td>
<td>1.6</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>0.44</td>
<td>1.9</td>
</tr>
<tr>
<td>Chemical and pharmaceutical</td>
<td>0.58</td>
<td>2.6</td>
</tr>
<tr>
<td>Mechanical industry</td>
<td>0.89</td>
<td>4.9</td>
</tr>
<tr>
<td>Means of transport</td>
<td>0.95</td>
<td>4.6</td>
</tr>
<tr>
<td>Food, drink and tobacco</td>
<td>0.13</td>
<td>1.0</td>
</tr>
<tr>
<td>Textile and clothing</td>
<td>0.33</td>
<td>1.9</td>
</tr>
<tr>
<td>Timber and wooden furniture</td>
<td>0.27</td>
<td>1.6</td>
</tr>
<tr>
<td>Paper and printing</td>
<td>0.49</td>
<td>2.9</td>
</tr>
<tr>
<td>Rubber and plastic</td>
<td>0.66</td>
<td>2.8</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>$1.06 \times 10^{-6}$</td>
<td>2.0</td>
</tr>
<tr>
<td>Wholesale and retail distribution</td>
<td>$1.5 \times 10^{-7}$</td>
<td>0.6</td>
</tr>
<tr>
<td>Hotels and catering</td>
<td>0.21</td>
<td>1.2</td>
</tr>
<tr>
<td>Transport and communications</td>
<td>0.21</td>
<td>8.1</td>
</tr>
</tbody>
</table>

Elasticities are calculated regressing the rate of growth of employment in each branch (logarithmic prime differences) on the current and lagged values of the difference between the actual and trend GDP growth rates, plus the trend and a constant, using OLS with annual data for the sample 1951–1994.

This picture contrasts with the one presented in the analysis of US labour market (Abraham and Katz, 1986) where the job creating sectors were the more stable ones, and therefore, variability appeared to create turbulence and friction, thereby feeding unemployment.

This contrast is also apparent in relation to hiring and hiring costs. Contrary to what Weiss (1984) showed for the US, firing costs in Italy tend to be higher than hiring costs. In a heavily regulated labour market such as Italy’s, constraints on firing are much bigger than on hiring; considering the slack in the market, the existence of training provisions and institutions, the role played by small firms, job search assistance, and the management philosophy prevailing among European business, hiring arrangements have proved to be much less costly. A recent study (Jaramillo et al., 1992) showed that labour adjustment costs in Italy have been significantly asymmetric: particularly for large firms, the costs of separations appear dominant vis-à-vis those of accessions. This is explained by reference to the specificity of Italian legislation and institutions concerning hiring and firing.

To conclude, the analysis of factors affecting the relationship between structural variations in employment and unemployment would lead to predict on the whole a negative correlation, contrary to the Lilien hypothesis and to similar analysis conducted for North America: the more dynamic sectors in the services, the small firms, the new firms and the Schumpeterian creative destruction of business are more sensitive to cyclical and demand pressures; they find it easier to hire than fire; and therefore, operate better in a context characterized by greater variability.
of employment and structural dynamics. When and if this dynamics is stifled and eroded, as it was the case for Italy, unemployment would tend to grow.

However, theory would also predict that the degree of labour market imperfection and other frictions associated with labour intersectoral shifting be positively correlated with unemployment, as in Lilien.

It is necessary, therefore, to verify against empirical evidence how the different factors affect the relationship between $\sigma_t$ and unemployment, and which factors play a relatively greater importance.

4. Anticipated and unanticipated variability

Following Neelin (1987), we developed a model for testing the relationship between unemployment and employment variability in the Italian labour market using annual data from 1951 to 1994.

We intend to test whether shifts in the composition of labour demand have caused fluctuations in the aggregate unemployment rate.

The model must capture the fact that, as we discussed, different sets of explanatory factors lead to contrasting predictions in the relationship: in particular, we have seen that there are structural aggregate demand factors affecting positively the relationship between variability and employment (anti-Lilien), and frictional factors exerting a negative influence (pro-Lilien).

We need to construct then the independent variable, $\sigma_t$, distinguishing between the endogenous (shifts working through aggregate demand) factors and the exogenous (frictional shifts). This was done, following Barro (1977), Abraham and Katz (1986), and Neelin (1987), by introducing two distinct measures of sectoral labour reallocations: the predicted Lilien index, measuring the anticipated shifts induced by structural and labour demand factors, and the unpredicted Lilien index, capturing frictional unanticipated variations. We proceed in three stages.

(1) First of all, we construct an aggregate demand indicator. The unanticipated money growth rate can be taken as a proxy of swings in aggregate demand. This variable is constructed as the difference between the actual money growth rate series and the estimated one from the regression of the actual money growth rate on a constant, the two periods lagged values of the money growth rate, the difference between the actual public expenditure and the forecasted one, the ratio of unemployment rate to employment rate.

(2) Second, we determine the predicted values of sectoral and total rates of growth of employment. They were calculated by regressing the employment growth rates on a constant, the current and one lagged values of unanticipated money growth rate and a time trend:

$$\hat{I}_t = c + a_1 \text{resM}_t + a_2 \text{resM}_{t-1} + a_3 \text{TREND},$$
where $l_i = \log I_i \log I_{i-1}$ is the employment growth rate of $i$, where $i$ indicates the following sectors.

Similarly, we estimate the aggregate employment growth rate:

$$\hat{L}_t = c + a_1 \text{resM2}_t + a_2 \text{resM2}_{t-1} + a_3 \text{TREND}.$$ 

Together with the current value of the growth rate of unanticipated money supply, one lagged value has been included in the regressions since sectoral and aggregate employment growth rates do not necessarily adjust instantaneously to aggregate shocks. The trend variable captures the demographic and other changes which may have occurred in the labour market over the period.

However, the unanticipated money growth rate may not account for all the aggregate effects on both the sectoral and the aggregate employment growth rates. In order to capture the aggregate residual effects, we construct a variable using the weighted average of the residuals from the above regressions where the weights are the employment shares of each sector in the total employment. This variable has been included as an independent variable, together with the current and lagged money growth rate and the trend variable, in a further set of employment growth rate equations:

$$\hat{l}_i = c + a_1 \text{resM2}_t + a_2 \text{resM2}_{t-1} + a_3 \text{TREND} + a_4 \text{mpe1}_t,$$

$$\hat{L}_t = c + a_1 \text{resM2}_t + a_2 \text{resM2}_{t-1} + a_3 \text{TREND} + a_4 \text{mpe1}_t,$$

where $\text{mpe1}_t = e1_t / \sum l_i$ is the weighted averages of the residuals from the estimated regressions for each sector where the employment shares of each sector in the total employment $l_i / \sum l_i$ are utilized as weights.

By subtracting from the actual employment growth rates, sectoral and total the estimated residuals, we obtain the corresponding fitted employment growth rates series, sectoral and total, respectively:

$$\hat{l}_i - \hat{e}2_i = \hat{l}_i$$  

$$\hat{L}_t - \hat{E}2_t = \hat{L}_t$$

(3) Third, on the basis of the fitted series at sectoral and aggregate level, we calculate the predicted part of the Lilien index using the weighted average of the squared deviations between the sectoral fitted employment growth rates and the total one, where the weights are the actual employment shares in total employment:

$$\sigma_{l(p)} = \left[ \sum_{l} \frac{l_i}{L} \left( \hat{l}_i - \hat{L}_t \right)^2 \right]^{1/2}.$$ 

The “predicted” index captures the effects of swings in aggregate demand on the sectoral employment shifts. The residuals from the above regressions were regressed on the lagged value of the residuals themselves. Finally, we obtain a
new residuals series by subtracting the fitted series from the actual one. On the basis of the residuals series, sectoral and total, we calculate the “unpredicted” part of Lilien index:

$$\sigma_{\text{unpred}} = \left[ \sum_{1}^{23} l_{i}/L_{i} (e_{3_{i}} - E_{3_{i}})^{2} \right]^{1/2}. \tag{7}$$

This index captures the impact of sectoral specific shocks on the employment sectoral shifts.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Unemployment rate equations, 1952–1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variables</td>
<td>Dependent variable: DIS$^{a}$</td>
</tr>
<tr>
<td></td>
<td>Intercept</td>
</tr>
<tr>
<td>Intersectoral model</td>
<td>0.02 (1.61)</td>
</tr>
<tr>
<td>Interregional models</td>
<td>0.002 (0.54)</td>
</tr>
</tbody>
</table>

The models are estimated using OLS with annual data for the sample period 1952–1994 in the aggregate version and 1952–1993 in the regional version. The dependent variable DIS$^{a}$ is the unemployment rate series which has a mean of 0.08 and a standard deviation of 0.02; $\sigma_{\text{r}}$ is the total Lilien index which at aggregate level has a mean of 0.03 and a standard deviation of 0.01; $\sigma_{\text{xp}}$ and $\sigma_{\text{r}}$ are the Lilien predicted and unpredicted index, respectively; $\sigma_{\text{r}}$ is the regional Lilien index which has a mean of 0.03 and a standard deviation of 0.04; $\sigma_{\text{xp}}$ and $\sigma_{\text{r}}$ are the predicted and unpredicted part of the regional Lilien index, respectively.

Quite similar results are obtained by taking as a dependent variable the unemployment rate in its strict sense as opposed to that which include those who are seeking employment.

$^{a}$-Statistics in parentheses (); $p$-values in brackets [ ].
We can now proceed to test the model including both the predicted and unpredicted Lilien indices among the independent variables to explain the unemployment rate (see Table 3). The other independent variables are the lagged unemployment growth rate itself, and both the current and the lagged values of the unanticipated money growth rate.

The results are statistically significant and confirm our ex ante hypothesis.

The coefficient of the “predicted” index is negative and significant at the 5% significance level, meaning that sectoral shifts which can be attributed to aggregate economic activity cause changes in the unemployment rate in the opposite direction. In particular, a rise in the “predicted” Lilien index, corresponding to increases in the (positive and/or negative) deviations between the sectoral employment growth and the total one caused by aggregate demand, produces a decrease in the aggregate unemployment rate. The coefficient of the Lilien “unpredicted” index is positive and significant at the 10% significance level; therefore, also frictional sector-specific shocks influence the Italian aggregate unemployment rate. In particular, a rise in the unpredicted index, which corresponds to increases in the deviations (positive and/or negative) between the sectoral employment growth rates and the total one caused by exogenous shift, increases aggregate unemployment. The lagged value of the aggregate unemployment rate itself is positive and highly significant denoting a strong persistence in the unemployment rate series, while the two period lagged value is not significantly different from zero. On the basis of Adjusted $R$-squared, the standard error of regression, the $F$-statistic and the $Q$-statistic, the estimated regression represents a good fit.

In conclusion, the empirical test confirms that high intersectoral employment variability in Italy has been associated with low unemployment; in the 1970s and throughout the 1980s, but above all in the 1990s, variability diminished and unemployment rose correspondingly. Employment restructuring and sectorial re-conversion in Italy was sustained essentially by demand pressure and employment creation. New jobs pulled human resources from declining sectors, assuring fluidity to labour market mechanism.

5. The impact of regional employment shifts

Interregional shifts closely interact with intersectoral ones. Localization factors have played an important role in Italian economic development, where new expanding areas have attracted business and jobs (in the so-called Adriatic belt) and declining ones have faced reconversion and labour shedding. In order to take into account the territorial dimension of employment variability, we constructed a regional Lilien index, measuring regional shifts in employment, and analysed it in the framework of the set of relationships between variability and unemployment discussed above (Table 4).
Table 4
Unemployment rates by macro-regions (1963–1994) (ISTAT, several issues-a)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Northwest</td>
<td>1.9</td>
<td>2.6</td>
<td>1.8</td>
<td>3.2</td>
<td>5.1</td>
<td>6.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Northeast</td>
<td>3.0</td>
<td>3.0</td>
<td>2.4</td>
<td>3.1</td>
<td>5.1</td>
<td>6.0</td>
<td>6.2</td>
</tr>
<tr>
<td>Centre</td>
<td>3.0</td>
<td>3.7</td>
<td>3.5</td>
<td>5.0</td>
<td>5.7</td>
<td>8.3</td>
<td>9.0</td>
</tr>
<tr>
<td>South</td>
<td>3.7</td>
<td>4.5</td>
<td>5.0</td>
<td>6.8</td>
<td>10.7</td>
<td>17.4</td>
<td>17.8</td>
</tr>
</tbody>
</table>

The regional shift index is calculated taking the square root of the weighted sum of the variances of regional employment growth rates using as weights the employment share of each region on the total employment:

$$\alpha_t = \sqrt{\sum_{j=1}^{19} \frac{I_{jt}/L_t}{L_t} \times \left( l_{jt} - \bar{l}_t \right)^2}^{1/2},$$

where $I_{jt}/L_t$ is the employment share of the region $j = 1, \ldots, 19$ (Molise was joint with Abruzzi until 1965, so we have 19 rather than 20 NUTS-II regions in Italy); $l_{jt}$ and $\bar{l}_t$ are the employment growth rates, regional and total, respectively in terms of logarithmic first differences $l_{jt} = \log l_{jt} - \log l_{t-1}$.

Following the model described above, we regress the unemployment rate on a constant, one lagged value of the unemployment rate itself, the current and lagged values of the regional shifts index, the current and lagged value of the unanticipated money growth, and a time trend.

Table 3 summarizes the results of the estimates, confirming a priori hypotheses and closely corresponding to those obtained considering intersectoral variations. The coefficient of the predicted regional Lilien index is negative and significant; the non-predicted regional index is on the contrary positive and significant; therefore, both frictional unemployment-creating effects and structural labour demand employment-creating effects were at play in accounting for interregional mobility. In other words, the regional reallocation of labour has created some unemployment due to frictions and barriers to mobility, but this effect has been more than compensated for by the employment creation effect of labour reallocation which, by shifting labour away from declining regions to areas of economic expansion, kept unemployment under control. In the later part of the period, interregional employment reallocation declined, the market became ossified at the regional level, and unemployment climbed steeply.

It is worth noting that the sectorial Lilien effect is six times greater than the regional one ($\sigma_{\text{reg}} = 0.30$ while $r_s = 0.05$; see Table 3), suggesting that industrial factors played a much bigger role than localization factors. But the two indicators appear strongly multicollinear, i.e. the two sets of factors operated in the same
direction. Moreover, the lagged value of the unemployment rate is highly significant denoting a strong persistence in unemployment.

6. Conclusions: the erosion of conventional sources of labour flexibility

We can conclude on the basis of empirical evidence that what contributed to stifling and drying out the intersectoral and interregional flows of employment restructuring also contributed to the increase in unemployment in Italy. The econometric exercise points out that the relationship between employment variability and unemployment is robust and empirically founded. The model illustrates a pattern of labour market flexibility which characterizes the Italian case, but also the broader European one, as compared to better known North American or Asian models. New hires, employment creation, sectoral restructuring and regional mobility, which has kept unemployment down, rather than employment stability, intrafirm careers and the consolidation of already strong and successful sectors or enterprises. Or better, it is the lack of labour reallocation and sectoral shifts, their exhaustion in the passage from 1950s–1960s to 1970s and 1990s, which is at the root of the Italian and European employment sclerosis.

Variability and employment reallocation in the framework developed here reflect and call into question the operation of the structural and demand factors affecting labour mobility and flexibility. These factors are deeply rooted in the institutions and nature of Italian society: for instance, the role of the family in bearing the costs of unemployment and in the informal economy, or the “political exchange” with unions, or the dynamism of small and medium size enterprises. These factors created the conditions for the progressive adjustment of the labour market to successive waves of structural change through intersectoral and interregional employment shifts. At each wave, however, the responsiveness of the labour market weakened and lagged behind; correspondingly, the rate of unemployment has been steadily rising. The widening tax and social security wedge has hit particularly strongly small firms; the informal economy has been severely constrained by fiscal consolidation filling the loopholes of tax evasion and erosion; income transfers towards the aged and less mobile segments of a rapidly aging population have had disincentive effects to relocation of business and labour. These developments in the context of rigid hiring and firing mechanisms and narrow wage differentials, highly regulated product and housing markets and weak infrastructures, explain how and why the flexibility patterns of the Italian labour market were lost in the 1990s.

The Italian experience of employment shifts illustrates broader European concerns and challenges: how the diversity of local cultures and labour market institutions can allow sectoral and regional shifts in jobs and skills; how labour standards and a high degree of security and stability can be maintained in an
increasingly competitive environment; what is the most appropriate policy mix between labour mobility and flexibility.

7. Data sources

Aggregate data on sectoral employment from 1970 to 1994 are the official ones, as provided by the National Statistics Institute (ISTAT). For the period 1951–1969, the series are drawn from a data bank (see Golinelli and Monterastelli, 1990) reconstructed on the basis of national accounts estimates.

At the regional level, employment data are the official ones for the period 1980–1993. From 1951 to 1959, the series have been reconstructed on the basis of unpublished ISTAT data; from 1960 to 1979, the series are drawn from the volume “Occupati per Attività economica e Regione” in ISTAT “Collana di informazioni”, 1981 and 1982, no. 3 and no. 4 (ISTAT, several issues-b). The sectors considered are the following: agriculture; energy; ferrous and non-ferrous metals; non-metallic mineral products; chemical products; mechanical industry; means of transport; food, drink and tobacco; textile and clothing; timber, wooden products and furniture; paper and printing products; rubber and plastic products; other manufacturing industries; building and construction; total manufacturing industry; wholesale and retail trade; lodging and caterimg services; transport and communication services; services of credit and insurance institutions; business services provided to enterprises; public administration; other non-marketed services. It would have been interesting to replicate the test in Abraham and Katz (1986) by using in the unemployment regressions the number of vacancies as the dependent variable. However, unfortunately, vacancy data are not available for Italy.

The money series (M2) for the period 1975–1994 is provided by the Bank of Italy (Banca d’Italia, various years), while from 1951 to 1974, the data bank of Fratianni–Spinelli (Fratianni and Spinelli, 1991) is used.

The unemployment series is drawn from ISTAT “Annuario Statistico Italiano” for the period 1952–1994 (ISTAT, several issues-a) and from ISTAT “Rilevazioni Campionarie delle Forze di Lavoro” for the period 1959–1994 (ISTAT, several issues-c).

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