

Book Review

Vivarelli, M. and Pianta, M. (2000), *The Employment Impact of Innovation: Evidence and Policy*, 240 pp. Routledge, London.

Technological progress is an important theme in the economic literature, and one which addresses patterns of economic growth. This book sheds light on the link between innovation and employment performance in our economies by providing in depth empirical study in this field. It represents a useful analytical tool for both scholars and policy-makers alike who are seeking a different approach to analysing unemployment issues as well as fighting them more effectively.

The specific contribution of this book is to overcome the limits of current economic debates about unemployment features by introducing an explanation based on the importance of structural factors. This suggestion is not marginal. Current economic debate focuses on two prominent theories which explain unemployment by following different analytical approaches.

The first, is one in which neo-classical scholars identify rigidities within the labour market as the reason why many labour markets, particularly the European ones, experience high unemployment rates. Unemployment is the outcome of institutional restrictions that, by limiting the operation of the labour market, harm the natural balancing power of the market itself.

The second approach is represented by Keynesian thinking, which interprets unemployment as the result of unsatisfactory demand conditions. Unemployment in this approach is seen as proof of the failure of unregulated markets: supply does not create its own demand; it is unemployment that supports the need for state intervention in the labour market through increased demand and employment-friendly policies.

These two theories are substantially different in analytical terms and policy implications, but also share some important features.

- Keynesian and neo-classical interpretations of unemployment both fall “within” the labour market analysis, the contribution they adopt from other disciplines being marginal to unemployment issues.
- The two schools of thought deal with the concept of equilibrium which has been overshadowed by the development of dynamic and disequilibrium models.
- They are “partial” interpretations of the labour market, for they make assumptions that shift research focus mainly to demand or supply conditions. In particular the assumptions related to innovation, lead to policy implications suffering from this theoretical limitation.

The need for a broader and more effective way to understand unemployment rises from this analysis. It seems useful to fit the Classical and the Keynesian unemployment explanations into a wider approach characterised by the emergence of multidisciplinary aspects, by the dynamic interpretation of the unemployment problem, by the recognition of the role of structural factors, and by the appreciation of the increasing importance of technological progress and innovation in our economies.

Vivarelli and Pianta’s book succeeds within this theoretical framework. They propose a different ranking of factors affecting unemployment; this analysis is followed by a discussion of differences in the evaluation of policy tools discussed in mainstream economics (for a comparison, see Layard et al., 1991).

The *first chapter* of the book goes directly to the core issue with a general description of the set of structural factors affecting unemployment. In particular the authors consider the roles played by technological change, globalisation, demand, sectoral structure, the firms’ organisation, labour costs and labour market rigidities, and the new forms and quality of employment. The main goal



of the book, explaining the dynamics of employment from the perspective of technological change, is surely an arduous task; however the construction of robust empirical evidence, is a step in right direction. It is only possible to go beyond the current debate about innovation and employment by starting from the empirical evidence on which it is built.

In the *second chapter*, Spiezia and Vivarelli detail the analytical framework within which all the indirect impacts of technological change on employment are explored. The authors also discuss the need for a deeper methodological investigation of this issue. It is essential to refuse a priori optimistic or pessimistic views about the future of employment; many writers use technological change to forecast employment features that have failed to match the empirical evidence.

This chapter also features a discussion of the strength of compensation mechanisms suggested in the economic literature (for a complete discussion of compensation theory, see Vivarelli, 1995), and of the effect of the spread of ICTs (Information and Communication Technologies) on employment.

Compensation mechanisms relate to the economic system's capability for creating new jobs that counterbalance employment displacement following technological progress. Economic theory has provided arguments to both sustain and reject the effectiveness of these mechanisms. The authors discuss six compensation mechanisms.

Compensation "via new machines" is generally seen as questionable. The idea that the creation of new jobs in the capital sectors where new machines are produced, counteracts the employment reduction in the user sectors has been much criticised by many economists. Machines are profitably employed if they merely allow the same production with far fewer men. Moreover, capital sectors can be affected by labour-saving technologies as well.

Technological progress causes unit costs to decrease, and that in turn, leads to a fall in prices or an increase in profits. The former effect determines the compensation "via decrease in prices" resulting in a consequent increase in demand, supply and employment. The latter relationship leads to the compensation "via new investments"; new jobs are created by the investment of those

extra profits. These compensation mechanisms can be effectively criticised by emphasizing the limits of the assumptions of Say's law.

Looking at the wage earners, two contrasting effects are stressed in economic theory. If the introduction of new technologies leads to reductions in wages, more labour-intensive techniques of production are employed. On the other hand, if technological progress leads to higher wages, this represents a stimulus to demand, that in turn positively affects production and employment. The compensation mechanism "via a decrease in wages" is criticised by considering the Keynesian explanation of unemployment; namely – by stressing the importance of effective demand in affecting employment dynamics. The compensation mechanism "via an increase in incomes" collides with the end of the Fordist labour-wage nexus and the development of new institutional contexts.

The compensation "via new products" is the most effective. The creation of new production branches results in the creation of new jobs. Nevertheless, the overall employment outcome has to be observed with respect to the possible displacement effect of old products and needs.

The analytical framework developed by the authors leads naturally to the empirical tests discussed in the *third chapter*. Here, Simonetti, Taylor and Vivarelli test the compensation theories through a 3SLS estimation of an aggregated macro-model as applied to 4 industrialised countries (U.S., Italy, France and Japan). The objective is to verify the effectiveness of each compensation mechanism. The results point out the role of the countries' institutional structure and the importance of the various macroeconomic relationships developed by compensation mechanisms theory. Process innovation for example is very significant in Italy and Japan while product innovation is positive and significant in U.S. In these countries, there is also a negative relationship between employment and process innovation. This is associated with the importance of innovation featuring investments in capital goods, which then results in increased productivity. In the latter, data about product innovation demonstrates the leading role of the U.S. in consumer goods innovation. Empirical analysis gives partial support to the compensation mechanism "via a decrease in

prices" and little support to that "via new machines". Compensation mechanisms "via new incomes" and "via a decrease in wages" are related to the analysis of the national labour markets structure. Compensation "via new incomes" exists in all countries while compensation "via decrease in wages" is verified only in the flexible U.S. labour market.

Piacentini and Pini look at the relationship between growth and employment in the *fourth chapter*. They interpret employment as the result of three main factors: demand dynamics and its components, the role played by wages as a component of the supply costs, and aggregate demand via the state of technology and its effects on productivity and distribution patterns. The empirical research assesses these relationships by employing detailed examination of the different national growth trajectories. Germany, U.S., U.K., Italy, France, Sweden and Japan are the countries targeted by this analysis. The results show an employment elasticity of growth ranging from 0.1 to 0.2 per cent but with U.S. having an average elasticity higher than 0.5 per cent. These values all decreased at the beginning of the 1990s. After analysing the employment intensity of growth paths in the last fifteen years, the authors adopt the cumulative causation growth model of the regulation approach to investigate the reasons for the emergence of a vicious circle between growth and employment dynamics in these years. The empirical outcomes show the poor employment performance of European countries as the result of the weak autonomous demand and of the negative contribution of the "employment multiplier" whose features are extensively described by the authors. The positive U.S. employment dynamics are due mainly to the contribution of autonomous demand growth that is higher than the productivity growth. The employment multiplier is instead the main factor allowing for the slightly positive employment dynamics in Japan.

The distinction between product and process innovations and their contrasting employment effects is then discussed by Pianta. He focuses on the labour-friendly or labour-saving effects related to different innovative activities, and on the importance of the sectoral composition of the economy and firms' strategies in the attempt to understand the employment dynamics. The

analysis of the EU-sponsored CIS (Community Innovation Survey) supports that view. This allows the identification of several employment outcomes with respect to the different nature of technological change and the importance of national factors. Demand growth and prevalence of product innovations are important factors for positive employment performances, while the empirical analysis points out an insignificant role of export orientation and labour costs in affecting employment.

This distinction between product- and process-oriented industries is crucial in assessing the different patterns of employment change and the reasons for the poor employment performance of European countries with respect to the U.S. Product-oriented industries witness better employment outcomes than process-oriented industries. The creation of new jobs is favoured in the former industries by the expansion of the markets and the functioning of compensation mechanisms. The process-oriented industries suffer technological unemployment, job losses and the ineffectiveness of compensation mechanisms.

Further evidence on this topic is provided by Askenazy. His study discusses the productivity and employment impacts of the introduction of new technologies and work organisation in U.S. manufacturing by focusing on the labour demand. Technological change and IT reorganisation have different effects on employment. The former has a small effect on the overall employment level while the latter shows a significant labour saving consequence. Technological change seems biased against production workers while IT reorganisation involves more white-collars workers.

The employment impact of innovation in the service sector is introduced by Evangelista. The service sector has not yet been analysed closely in spite of its importance to our economies and its central role in the process of structural change. The delay in research is in part due to the analytical and methodological problems that arise in the attempt to study the innovation-employment link in the service sector. The cluster analysis developed by employing an Italian service-specific dataset leads to the identification of four groups of economic sectors whose employment dynamics are assessed.

The intensive use of the available data in these chapters aims at giving the book an empirical

underpinning. The attempt to analyse the employment outcomes dynamically, the patterns of technological change and the evolution of economic structures through a comparative approach is particularly rigorous. Nevertheless, the same authors recognise the need to consider the effect on growth and employment of the new ICT paradigm in terms of social innovations, and, more specifically, the income distribution issue related to the productivity gains induced by technological change.

The relative novelty of the empirical studies presented in the chapters faces the data shortage related to the innovation-employment issue. Looking to future studies, the link between theory and the empirical evidence deserves more research, possibly using specific new datasets explicitly dealing with innovation and employment. In other words, this book encompasses a new approach to interpreting unemployment, but its results will have further confirmation only by employing specific new datasets.

The role of learning strategies is the subject of Lundgren's chapter: which emphasizes that economic growth results from several factors, so that a single policy cannot promote economic growth and employment. The uncertain nature of technology gives strength to the development of non-discriminating learning policies in the labour market; these actions can provide economic agents with the most effective tools for reducing and overcoming this uncertainty.

So far, the innovation-employment relationship has been widely discussed with respect to developed countries; but is it possible that the impact of innovation on employment is unbiased with respect to the level of a country's development? Karaomerlioglu and Ansal address this issue by analysing the compensation mechanisms and policy implications for developing countries using data from a Turkish survey. Their results suggest weaker compensation mechanisms in Turkey and potentially other developing economies as well.

Reinert introduces a broader multidisciplinary view to the employment-innovation issue. He contributes to the discussion on compensation mechanisms and economic growth by looking at the history of economic policy. Further, changes in policy today are discussed within a historical perspective.

Pianta and Vivarelli conclude with a discussion of whether employment-friendly policies are possible. Many suggestions on this follow a summary of the core findings of the book. The editors succeed in linking the current policy implications with long-term patterns in the impact on employment of innovation. For example, state intervention is seen as an important condition for developing new macroeconomic, industrial and innovation policies. Questioning the alleged market supremacy in terms of employment outcome effectiveness is crucial to make room for the development of targeted policies that could fight technological unemployment, introduce new learning policies, unite growth, and encourage economic and social innovation with equitable income distributions.

In sum, this book makes for interesting reading on account of the innovative theoretical and empirical perspectives it discloses to the reader.

References

- Freeman, C., J. Clark and L. Soete, 1982, *Unemployment and Technical Innovation*, London: Pinter
- Freeman, C. and L. Soete, 1987, *Technical Change and Full Employment*, Oxford: Basil Blackwell
- Freeman, C. and L. Soete, 1994, *Work for All or Mass Unemployment?*, London: Pinter
- Layard, R., S. Nickell and R. Jackman, 1991, *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford: Oxford University Press
- Vivarelli M., 1995, *The Economics of Technology and Employment: Theory and Empirical Evidence*, Aldershot: Edward Elgar.

ANDREA CONTE

Università Cattolica di Piacenza

Copyright of Small Business Economics is the property of Springer Science & Business Media B.V.. The copyright in an individual article may be maintained by the author in certain cases. Content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.