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*Growth, Productivity and Employment:*

*Do Income Distribution and Internal Components of Demand Matter ?*

**Paolo Piacentini - Paolo Pini**

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## Growth, Productivity and Employment: Do Income Distribution and Internal Components of Demand Matter ? ♦

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### *Summary*

The paper considers the macroeconomic relationships between employment, technology and growth, focusing on the role of internal demand component and income distribution. The debate on the technological causes of the jobless growth and on the intensity of the well-known compensation mechanisms is considered from this point of view.

It is argued that the recent growth path of the industrialised economies, started at the beginning of the eighties, does not show the rise in its employment intensity pointed out by some authors. The evidence seems to suggest, on the contrary, a decrease in the ratio between employment growth and value added growth - both at the aggregate and sectoral level - for many European countries, in particular since the second half of the eighties and nineties.

The virtuous circle between demand growth and productivity growth favourable to employment dynamics, which characterised the sixties and seventies, does not emerge anymore in the last fifteen years, when a negative relation between employment dynamics and productivity growth appears. On the basis of some empirical research adopting the cumulative growth model of the “regulation school” (with internal and external causation mechanisms) for the period 1960-1990, this change seems to be explained by the decreased intensity of endogenous

compensation mechanisms, such as changes in income distribution, and changes in important macroeconomic relationships between investment, consumption, and net export.

Finally, the paper proposes a quantitative assessment for the more recent years (1991-1995) of the impact of demand side factors, i.e. growth, composition and distribution of income, on the determination of changes in the aggregate balance of employment. The level of employment warranted in a system is here derived from the application of a simple scheme which we have called, following the contributions of Richard Kahn and John Maynard Keynes, the “employment multiplier”. Starting from an accounting identity between the values of aggregate supply and demand, a level of “warranted” employment is derived, given the labour coefficient and the deflated values of final demand, in which autonomous components are distinguished from an induced component, this latter depending on total labour income. Thus, the variations of aggregate employment for a country can be decomposed into the effects of the contributions of three components: growth of average productivity of labour, growth of “autonomous” demand components, and variations of the “multiplier”, a term which summarises the impact of wage share and consumption propensity on induced demand and again on the level of overall employment.

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# **Growth, Productivity and Employment: Do Income Distribution and Internal Components of Demand Matter ?**

**Paolo Piacentini - Paolo Pini**

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## 0. Introduction

0.1 The persistence of high unemployment levels in the major European countries, and the evidence of a small employment elasticity reflecting in an inadequate reabsorption capacity of the labour supply excess, even in the most favourable phase of the cycle, suggest a reconsideration of the schemes aimed at modelling the determination of aggregate employment balances.

In the eighties, a line of research broadly defined as the one of partial equilibrium analysis in the aggregate labour market has been quite pervasive. Unlike the conventional approach of labour demand and supply function in perfect competitive markets, this line has been able to explicate in the formalised models and empirical analyses relevant institutions and behaviours: bargaining and contract settlements, trade unions actions, job search strategies, workers selection in context of imperfect competition, etc. At the aggregate level of analysis, however, the variety of these schemes find a synthesis in an analytical representation which identifies an equilibrium rate of (un)employment as the solution of wages and prices push factors on the workers and firms side. We refer, in particular, to schemes which define an equilibrium rate for (un)employment (NAIRU, etc.) through the interactions of “wage equation” and “price equation” emerging on an idealised “real wage-employment” plane, i.e., in a context of partial equilibrium analysis for labour market.

Thus, these schemes tend to provide a “classical” sequence where, starting with the concept of partial equilibrium in the labour market, the level of activity of the system and the level of employment are derived in a way that they are compatible with a unique labour market not-inflationary equilibrium. The factors affecting the “final demand” are eventually taken into account as possible causes of a short-run disequilibrium, and assuming however that an attracting process toward a stable long-run equilibrium prevails<sup>1</sup>.

<sup>1</sup> In the long-run, there is a natural level of employment determined in the labour market: in a context of imperfectly competitive firms, real wages and employment are jointly determined by the price-setting policy of firms and by the bargaining policy of workers. A unique natural level of aggregate demand compatible with no inflationary pressure is associated to this natural level of employment. In the short-run, a level of aggregate demand different from the natural one determines an upward or downward pressure on the level of equilibrium employment. If the employment level differs (e.g. higher) from the

In a text in which an interest for empirical results prevails, we do not intend to arise critical comments on these schemes so briefly summarised. However, we are not denying in the occasion an intention of encouraging a critical consideration of the relevance, for the medium-term performance of employment, of factors on the “demand side”. Thus, the approaches which follow are directly inspired by a different sequence where the employment outcomes derive from the dynamic of final demand, its components, productivity growth and income distribution. Indeed, beyond specific hypothesis regarding the microeconomic foundations of labour demand, we believe that these will prove to be of heuristic interest in the rationalisation of the different performances of employment growth in industrialised countries during the recent years.

Specifically, we believe that it is worth resuming and verifying three aspects which should help interpreting the poor employment performance of the European countries:

- a) the explicit consideration of the dynamic of demand components, assumed in a Keynesian fashion as the primary source of the determination of employment;
- b) the twofold role of wage dynamics, as structural element of the supply costs, on the one hand, and as main factors determining an induced demand component for consumption goods, on the other;
- c) the role played by productivity dynamic in the determination of the employment level, both as labour saving factor affecting adversely the employment, and as factor stimulating economic growth through its compensation effects on finale demand.

Thus, we will resume the view according to which the employment is essentially an *outcome derived from the final demand and its composition, from the state of technology and from how its changes affect distributive variables through the transfers of productivity gains on real income*.

equilibrium, pressures on wages and prices emerge, leading to a wage-price spiral. In the short-run, therefore, the unemployment rate may differ from the natural one, giving rise to costs in terms of growing or decreasing inflation rate, for example as a consequence of an aggregate demand level inconsistent with the equilibrium level. This framework determines both the long-run NAIRU based on structural variables in the labour market, and the gap between unemployment rate and the NAIRU and its adjustments toward the NAIRU. See Layard – Nickell – Jackman (1991)

0.2 In the first section of the paper, the employment intensity of growth is analysed for some important industrialised countries. It is argued that the growth path of industrialised economies in the last fifteen years does not show a rise in its employment intensity, as some international institutions have pointed out. The evidence seems to suggest, on the contrary, a decrease in the ratio between employment growth and value added growth - both at the aggregate and sectoral level - for many European countries, in particular since the second half of the '80 to mid '90. The worsening of the employment content of growth represents the end of the *virtuous circle favourable to employment* of the previous decades. Aggregate dynamics and sectoral specificities of the employment elasticities seem to suggest that the growth of unemployment in Europe can be traced in the increasing difficulties of the creation of job opportunities rather than in the rising of labour force growth. The analysis contrasts also the view according to which technological change does not bear any responsibility in the worsening of the employment content of growth. The negative trend in employment elasticity shows also the failure of most of the employment policies adopted in the last decade, mainly labour market policies. This seems to apply to the economic systems in which labour market regulations have been relatively maintained, as well as to economic systems in which *deregulation* policies have been mostly implemented.

The second section is devoted to analyse the change from the *virtuous circle between demand growth and productivity growth favourable to employment dynamics*, which characterised the sixties and seventies, to the *vicious circle adverse to employment dynamics* emerged in the last fifteen years, when a negative relation between employment dynamics and productivity growth appears. On the basis of some empirical research adopting the cumulative growth model of the "regulation school" (with internal and external causation mechanisms) for the period 1960-1990, this change - from *virtuous circle* to *vicious circle* - seems to be explained by the decreased intensity of endogenous compensation mechanisms, such as changes in income distribution, and changes in important macroeconomic relationships between investment, consumption, and net export. The

weakening of the employment compensation effects provides some explanation for the worsening of the cumulative mechanisms leading to lower employment intensity of growth.

Finally, the third section proposes a quantitative assessment of the impact of demand side factors in more recent years (1991-1995), i.e. growth, composition and distribution of income, on the determination of changes in the aggregate balance of employment. The level of employment warranted in a system is here derived from the application of a simple scheme which we have called, following the seminal contributions of Richard Kahn and John Maynard Keynes, the "employment multiplier". Starting from an accounting identity between the values of aggregate supply and demand, a level of warranted employment is derived, given the labour coefficient and the deflated values of final demand. In the final demand, autonomous components are distinguished from an induced component, which depends on total labour income. Thus, the variations of aggregate employment for a country can be decomposed into the effects of the contributions of three components: growth of average productivity of labour, of "autonomous" demand, and of the "multiplier", a term which summarises the impact of wage share and consumption propensity on induced demand and again on the level of overall employment.

## 1. The employment intensity of growth: in which direction has it changed ?

1.1 The role played by the productivity dynamic on employment performance in industrialised countries, and in Europe in particular, has been often challenged by economists (for review see Pini, 1992, Vivarelli, 1995, Petit, 1995). Recently, the new arguments have been based on the "evidence" of an increase in the employment intensity of growth in those years in which the unemployment growth has been higher. In brief, it has been claimed that:

- a) although the growth rate of production has been lower since the mid-seventies with respect to the previous decade,
- b) the rate of job creation has been higher in the same period with respect to the past,

- c) and the decrease in the growth rate of production per employee seems to have over-compensated the decrease in the growth rate of demand,
- d) so technical progress can not be blamed for determining the rise in unemployment.

This argument has been put forward mainly within international organisations (OECD, ILO, EC)<sup>2</sup>, but it is also shared by economists who do not seem to put particular confidence on market mechanisms as equilibrating factors, as they emphasise market failures as causes of the failure to achieve a full employment equilibrium<sup>3</sup>.

Thus, it has been suggested that the technological nature of unemployment cannot find a confirmation in what happened after the crisis of the mid-seventies. The rise in the number of persons seeking jobs with respect to the total labour force appears in concomitance with a decrease, and not an increase, of the growth rate of labour productivity in this period. Then, other factors can be blamed for the rise of the unemployment rate which are not traceable in the goods market or in the labour demand side of the market, but mainly on the supply side of labour

market. In accordance with this view, partial equilibrium analysis applied to the labour market would be valuable to stress the costly adjustment processes caused by institutional factors and regulations, and economic incentives which prevent the realignment of prices and quantities to the “right” equilibrium values.

This argument bears some serious limitations, which emerge by considering the dynamic of productivity as exogenous with respect to the dynamic of production, when it should be the interaction amongst them, both endogenous forces, to determine employment performance. In a different perspective, as it will be stressed later on (section 2), we should not be necessarily worried when the dynamic of productivity rises, as a particularly unsatisfactory employment performance can be the result, indeed, of a lower increase in productivity associated with a worsening of the growth path for the whole economy.

1.2 With reference to the stylised facts supporting the thesis of the irrelevance of technology, the following questions seem to be important:

- 1) Has the employment intensity of growth, measured as ratio between the rate of growth of employment and the rate of growth of production, or value added, really changed?
- 2) If it has changed, in which direction does it point? Has it increased recently, as sometimes it is claimed (EC, 1994), or is it lower than in the past decade?
- 3) In addition, do these changes, if they have indeed taken place, show some sectoral specificities, so that the aggregate result depends also on the sectoral composition of different economies ?

1.3 The analysis we carried out for seven OECD countries (table 1) does not show an increase in the employment intensity of growth for the years following the mid-seventies. Indeed, there is evidence of a decrease in this intensity, at least for some of the countries we have considered. In addition, in those circumstances in which a slight rise of the employment intensity of growth emerges, this seems to happen for a limited interval, in between the mid-eighties, while for the

<sup>2</sup> We refer to EC (1994), and OECD (1994). Similar arguments are presented in ILO (1995) too. However in ILO reports there are some significant differences: a) first, it is emphasised that the strong job creation recovery in Europe took place in the mid eighties, rather than in the whole period after 1973; b) second, there is no evidence of a labour force growth in European countries higher than in the United States (see also Pini (1997a, § 2.2) for details); c) finally, ILO policy recommendations appears fairly different with respect to the OECD ones (see *OECD Jobs Study* (OECD, 1994)), as they derive from an interpretation of unemployment growth more “macroeconomic oriented” and less “labour market oriented”. See also ILO (1996) for a more recent analysis, which share some of the view expressed by OECD (1994).

<sup>3</sup> Recently, it has been claimed that:

“The combination of stubbornly high unemployment and the spread of computer-based technology has led to a belief that economic growth no longer requires additional jobs to the extent characteristic of the ‘golden age’ of growth in the 1950s and 1960s. *This is very misleading.* Despite the halving of output growth in the OECD after 1973, numbers at work actually rose faster, up to the recession of the early 1990s, than before 1973” (Glyn, 1995, p.2, italics added; see also Boltho - Glyn, 1995).

In addition:

“The surprising finding of faster employment growth after 1973 is true of the EC where employment problems have been especially severe. [...] Total labour input in the EC was roughly constant over the period 1979-1990, while it probably declined at around 0.5 per cent per year over the period 1960-1973” (Glyn, 1995, p.2).

The analysis based on some stylised facts seems to suggest the following conclusion:

“The relative steadiness of employment growth implies that labour productivity growth has declined as much (or even more in hourly terms) than output growth. *It is absolutely wrong, therefore, to blame technology for ‘destroying jobs’ at unprecedented rate;* if this had been the case, labour productivity would have been rising faster than before” (Glyn, 1995, p.2, italics added).

following years the same evidence is not confirmed (Chart 1)<sup>4</sup>.

In addition, we should briefly emphasise two aspects related to the aggregate results.

- 1) The size of employment elasticity does not seem particularly large. For the whole set of countries, it is extremely rare to have elasticities around unity, for any period we consider. The only case for which the elasticities are fairly high is the United States, to a limited degree in the seventies (after 1973). Generally, the elasticities present values within the interval 1/10 - 1/5 %<sup>5</sup>, so that less than 10% of the increase in income translates into employment growth, with the remaining part being accounted for, obviously, by growth in valued added per employee.
- 2) In the period following the end of the eighties, the elasticities decreased significantly in all the countries considered<sup>6</sup>, and for some of them the last cycle is even characterised by a negative value<sup>7</sup>. So, even in those countries in which

<sup>4</sup> However, a *caveat* should be pointed out, concerning the pattern of the working time per worker. In fact, any evaluation of the employment intensity of growth in terms of job creation and job destruction should take into account changes in working time per worker, for its pattern significantly affects the determination of the number of jobs associated with a given growth rate in production. Notwithstanding the serious limitations of statistical data on working time per worker, there is evidence that in recent years the effective working time per worker is generally declined in most of the industrial countries. This has contributed to reduce the "apparent" product per-capita and to increase the volume of employment, given the level of production (EC, 1994, p.63). This negative trend in working time has been particularly significant in the European countries, while it is not so evident in the United States and also in Japan, at least until the early nineties. Consequently, the employment performance in the European countries can have been positively affected by this trend in working time per worker - obviously, at least from an "accounting" point of view. If this is the case, the total employment elasticity of growth, measured in terms of the number of workers employed (and not in terms of the total working time), is positively affected, *ceteris paribus*, in the European countries by the reductions in per-capita working time more than in other industrial countries, like USA and Japan where lower reductions in working time had occurred.

For a comparative analysis of the pattern of working time per-capita in four countries (the United States, Japan, France and West Germany), see Vivarelli (1996). Another recent analysis of the effective working time in the European Union is provided by EC (1996, sections 6). In this report, the pattern of per-capita working time is decomposed in three factors: (a) changes in the sectoral composition of the economy; (b) changes in the composition of labour force and in the contractual typologies (i.e., *part-time* e *full-time contract*) within sectors, (c) changes in the standard working time within sectors, for the different labour force components and contractual typologies. The analysis shows extremely strong compositional effects - (a) and (b) - for all the European countries, while the third factor (c) appears less important, and moreover with a decreasing effect in the nineties.

<sup>5</sup> With the exception of the United States, where this average value is higher than 1/2.

<sup>6</sup> With the exception of France and Japan.

<sup>7</sup> Specifically, Italy and Sweden.

there has been evidence of a rise of employment elasticities in the eighties (the United Kingdom and West Germany), there are recently signals of a decrease of these elasticities and they show a return to a growth regime for which growth in income breeds less pronounced positive employment variation, at least until 1995.

1.4 An additional aspect we would like to emphasis is represented by sectoral specificity of employment elasticities of growth.

For all the countries considered, the primary sector as well as the secondary sectors of the economy are characterised by negative employment elasticity, because of employment losses in these sectors. Both in the primary sectors and in the secondary sectors, *jobless growth* emerges as the dominant characteristic (Chart 2).

Some aspects can be stressed as regards primary and secondary sectors:

- 1) Only in United States and Japan there is evidence of significant and positive employment elasticities, while for European countries, even in the more favourable circumstances for their growth, the value of these elasticities always appears as extremely negative.
- 2) The positive values of the elasticities show significant reductions cycles after cycles even in those countries where initially they were higher.
- 3) Negative values characterise the elasticities for most part of the cycles since the seventies.
- 4) In the eighties and nineties employment elasticities became negative also for those countries for which in the past a positive correlation between changes in value added and employment were almost the rule.

The *jobless* character of growth does not appear to distinguish the performance of service sectors, indeed positive elasticities between employment and production are nearly dominant in these sectors. However, it should be recognised that for market and non-market services, some positive aspects came along with negative aspects, yielding less favourable performance than we could reasonably expect.

As far as *positive* aspects are concerned, our analysis provides confirmation of the following evidence:

- 1) For most of the cycles in every country, the employment elasticity of growth appears substantially higher for services than for the whole economy, and its values are within the interval of 1/3 and 1/2; thus a conspicuous part of income growth translates into new jobs.
- 2) In the European countries in particular there is evidence of significantly higher elasticities in services with respect to the whole economy. The first being four times higher than the second (the gap is in between 0,3 and 0,5 percent point, as average for the whole period). This seems quite important because if this elasticity stays constant over time, a relative growth of these sectors will assure a favourable employment performance for the whole economy<sup>8</sup>. In the United States and Japan, instead, the difference between the two elasticities is much less pronounced, but their absolute levels are clearly higher with respect to those for European countries. In particular, in the United States, an average of about 2/3 of the value added growth in services is translated into new jobs; in Japan, the corresponding value is 1/2.

As far as *negative* aspects are concerned, our analysis provides confirmation of the following evidence:

- 1) The employment elasticity of growth in services does not seem to remain constant over time. For some of the countries considered, it appears higher during the seventies than later on. This seems to be the case for the United Kingdom and Sweden. For other countries, Italy and France, the decline emerges in the last cycle of the nineties, and it seems significant. If this trend were confirmed in the next period, the potential in terms of employment performance provided by the growth of these sectors, with the associated compensation effects of the negative employment dynamics in industrial sectors, would risk being reduced significantly.
- 2) Among the countries showing a negative trend for employment elasticity in services, we find the United Kingdom, that is the country with a positive tendency towards a rise of the overall

employment elasticities in the seventies and eighties. In addition, West Germany, although characterised by an increase of aggregate elasticity, does not present a similar rise of the elasticities for services. The only country which seems able to associate growth in aggregate elasticity and growth in service elasticity is Japan, especially for what is happened in the last cycle in the non-market services which presented an extremely high employment elasticity.

- 3) Among the European countries there is also evidence of a significant decline of employment elasticity for non-market services relative to those for market services. The decline is quite pronounced in the case of the United Kingdom and Sweden, and less - but nevertheless still significant - for West Germany and Italy. If, on the one hand, this result can be considered justified and appreciated, as far as "efficiency" recovery is concerned in these sectors without implying less "effectiveness". On the other hand it is important also to remember that non-market services have certainly played an important compensation role in the past. To the extent that the growth of these sectors in terms of value added will decrease, and it will be associated to a further decline in employment elasticity, this compensation role will be even more reduced in the future. In the meantime, market services in these countries do not seem to present a rise of their employment elasticity: they have been declining in Italy and in Sweden since the beginning of nineties, in the United Kingdom since the beginning of eighties, while there is evidence of an increase only for West Germany<sup>9</sup>.
- 4) Finally, among the market services, it is worth noting that the financial and insurance and the social, personal and community services are those with the highest employment elasticities, even over 1 for some cycles in some countries, while the remaining two sub-sectors - transport

<sup>8</sup> This is what is also suggested in official reports by international organisation: taking advantages of their relative low *labour intensive* character in order to realise a favourable employment performance for the whole economy (EC, 1993).

<sup>9</sup> It is worth to notice that the employment elasticities in market services seem to decline in the eighties and early nineties in Italy and France, while in West Germany and in the United Kingdom the elasticities are fairly constant and positive, but they are negative in Sweden; in addition the positive values are quite low. At the sometime, the elasticities in non-market services are generally positive and higher than the previous ones in West Germany, Italy, France and Sweden. Thus, the compensation role played by the non-market sectors appears significant in Europe. This conclusion applies also to a certain extent to Japan and the United States.



and communication, and retail trade, hotels and restoration - the elasticities are much lower<sup>10</sup>. When we compare the decade of the seventies with the subsequent period, there is also evidence of a decline of these high elasticities in West Germany (for the financial and insurance sub-sector), in Italy, the United Kingdom and France (for the social, personal and community sub-sector). Among the European countries, only for Sweden there is evidence of growing elasticities for both of these sub-sectors (even in the nineties)<sup>11</sup>.

1.5 Summing up, the analysis on employment elasticities for the seven OECD countries considered seems suggests the following main results<sup>12</sup>:

- A. No evidence emerges of an increase of employment intensity of growth in the period following the seventies; as a matter of fact there are indications of a decline in these elasticities for some of the countries, and stability for others.
- B. The only phase where there has been growth with a higher employment intensity is represented by the mid-eighties, characterised by a prominent income growth, while for the following years up to 1995 there is no more evidence of this fact.
- C. There are, on the contrary, proofs of a substantial worsening of the employment intensity of growth since the end of the eighties for most of the countries analysed.
- D. With reference to the magnitude of employment elasticities, their limited values should be remarked. At best, only half of the growth translates into new jobs. The European countries are certainly those with the lowest

values of employment elasticities: on average, only 1/10 of the growth translates in new jobs.

- E. With regard to sectoral specificities, the analysis shows that:
  - I. the primary and secondary sectors are generally characterised by negative elasticities, as they are marked by increasing employment losses;
  - II. on the contrary, services sectors present positive elasticities, and specifically:
  - III. in European countries the gap between employment elasticities in services and that for the whole economy is quite pronounced,
  - IV. however, the elasticities in services do not seem constant over cycles; there is evidence of a significant tendency towards their reductions, that in Europe characterised the non-market more than the market services.

1.6 Finally, we intend to remark an additional aspect related to the rate of new job creation, that can contribute in our view to challenge the claimed increasing capacity to create new jobs in European countries after the seventies. Indeed, the aggregate employment dynamics depends also on the sectoral composition, specifically in terms of value added and employment, and in addition on changes of this composition.

On the one hand, it is observed that the *apparent* labour productivity differs among sectors, generally higher in industry and lower in services. Given identical rate of growth among sectors, countries with sectoral composition relatively favourable to sectors with low labour productivity will experience better employment performance, and the employment elasticities of growth themselves will be shaped by these sectoral composition differentials. The better employment performance could be compensated only by different (higher) rate of growth, among countries or among sectors, more favourable to those countries with sectoral composition less oriented to sectors with less productivity, or more favourable to those sectors with higher productivity. Then, in the evaluation of relative employment dynamics among countries, the "sectoral composition factor" would demonstrate its great importance (Piacentini, 1987)<sup>13</sup>.

<sup>10</sup> It is also worth to notice the decline in elasticity in the second half of the eighties in Italy and France for retail trade, hotels and restaurants and for transport and communication sectors, while for the same period and sectors there is evidence of increasing elasticities in West Germany and, at a certain extent, in the United Kingdom..

<sup>11</sup> Similarly, these elasticities do not decrease in the United States and in Japan.

<sup>12</sup> In a comparative perspective, table 2bis presents the effective employment dynamic in the last fifteen years and that would prevail if the employment elasticities of growth would have not changed with respect to the previous decade. The gap between the two values suggest how much positive or negative changes in elasticities had matter for employment dynamics, given the sectoral growth rates of value added. The calculated values for the whole economy are obtained using the estimated sectoral variations in employment and the sectoral employment composition in the reference period.

<sup>13</sup> For a more recent analysis based on Piacentini (1987) see Beatrice-Borzaga (1996), in which an application to a greater number of countries is carried out, up to the year 1990.

On the other hand, the sectoral composition for an economy is itself subject to changes over time, in terms of both value added and jobs. The related question arising is the following: to what extent is aggregate employment growth in the eighties and early nineties due to employment growth within specific sectors, and to what extent, instead, is it derived from changes in sectoral composition of the economy?

This question seems quite important for making comparison between two groups of countries differing from each other in terms of sectoral composition, specifically European countries and United States which presents a sectoral composition less oriented to industry with respect to the first group. We can expect that changes in sectoral composition in Europe towards services, where the product per employed is lower, implies in itself relative employment dynamics more favourable with respect to those in the United States, where most of this shift has already occurred in the past<sup>14</sup>. Even if European countries in the eighties and beginning of nineties would have experienced relatively better employment performance than in the past, this could be attributed to some extent to changes in their sectoral composition, rather than to their better absolute capacity to create new job opportunities.

To investigate how much employment growth derives from changes in employment composition of each single economy, and it can instead be explained by absolute sectoral performance, we have decomposed the aggregate result into two components, one related to sector growth and the other related to sectoral composition changes. The first component - "sectoral effect" - is obtained for each given sectoral composition of the economy within a specific period considered, while the second component - "composition effect" - represents the contribution provided by the changes in the sectoral composition of the economy to any given identical rate of growth. Results are presented in table 2.

There is evidence that a significant part of the overall employment variations in the eighties and beginning of nineties for every country depend on changes in sectoral composition in terms of employment. Among the European countries, the

sectoral effect appears positive only for West Germany, while there is evidence of fairly large negative values for Sweden, France and Italy (in decreasing order). Japan presents a sectoral effect similar to West Germany, but with a much higher composition effect, while the United States is the only country with a relatively low composition effect, as expected. Thus, the analysis suggests that most of the employment gains in the European countries considered are due to changes in sectoral composition of the economy, rather than to an absolute higher capacity to create new jobs within sectors. In other words, it is the rise of the relative share of service sectors with respect to industrial sectors which explains significantly the new job opportunities in this period<sup>15</sup>. Then, the catching-up in sectoral structure among economic systems has played a significant role in determining relative employment performance in Europe.

1.7 Thus, these results suggest the emergence of an important change in the dynamic relationship between volume of production and employment. Though they confirm a strong, direct causal connection between the first and second variable when a fall in production is occurring, such a connection does not appear in the phases in which production increases. While economic growth in the fifties and sixties went with high rates of production growth, almost full employment and considerable and widespread product innovation, the growth regime of the seventies and eighties featured low growth rates, low employment intensity, and pervasive process innovation. There are ample and convincing stylised facts which show that in circumstances favourable to growth, employment volume does not necessarily increase. For the industrial sectors, in particular, the restructuring processes (both in terms of organisation and technology) which were carried out in the periods of crisis meant irreversible structural changes, which inhibited a recovery in employment in periods of growth.

The relationships between growth in demand, in productivity and employment in the industrial sectors of OECD countries vary both for the countries and the time spans involved. There is not

<sup>14</sup> At least, for any given growth rate of income, and assuming that in the United States the changes in sectoral composition is slower nowadays than it has been in the past.

<sup>15</sup> Table 2 presents also a similar decomposition with reference to the employment dynamics on the basis of the sectoral employment elasticities in the previous decade (table 1bis). Even in this case, the composition effects appear quite relevant for every country.

only an evident weakening of the causal relation between demand and productivity, but also profound changes over time and significant differences between countries above all in the relation between demand and employment<sup>16</sup>. Indeed, the aim of some research has been to examine the interaction between economic growth and technical progress in economic systems open to foreign trade and to analyse the effects on the volume of employment. The principal aim of this research is to identify empirically possible explanations for the medium- and long-term dynamics of industrial employment in some OECD countries.

## 2. Productivity growth and demand growth: empirical evidence for a cumulative causation model

2.1 Among the various research lines which aim at explaining the weakening (and according to a pessimistic view, the disappearing) of the *virtuous circle* of growth *favourable to employment*, there is an interpretative scheme which appears particularly useful in our discussion. In fact, this scheme identifies the factors of the employment crises in industrialised countries in the weakening of some reabsorption mechanisms suggested by the well-known “compensation theories”.

We are referring to the *scheme of cumulative growth*, whose origins are in the works of Kaldor and Verdoorn on increasing return to scale and on the partially endogenous technical progress, and to which the *French school of regulation* has brought important contributions in the fields of demand formation, transfer mechanisms of productivity gains on real income and their effects on the different components of aggregate demand.

In the cumulative growth scheme presented here, the institutional and distribution systems play an important role for the determination of the *virtuous circle favourable to employment*, shaping the causal links between productivity and goods demand. Specifically, the distribution sphere within a specific institutional context appears as one of the most important categories placed in the analysis of employment effects of technological

change at the centre of the various interrelations between demand side and supply side of the market.

In the works of the *French school of regulation* (in particular, for our discussion, Boyer, Coriat and Petit), the theoretical framework used is the Kaldorian approach of cumulative growth based on the interrelation between growth in productivity and growth in demand (Kaldor, Thirwall, Cripps and Tarling). This interaction develops along two different sequences or causal relations. On the one hand, increases in productivity are stimulated by growth in overall production, and on the other, the same increases in productivity stimulate growth in overall demand. The employment dynamic is the composite result of this interaction, given by the gap between productivity growth and demand growth. This model has been generalised by Boyer, Coriat and Petit to extend the set of the possible growth regimes, in order to consider not only stable dynamic equilibrium, but also unstable dynamic equilibria and disequilibrium situations<sup>17</sup> (Chart 3).

2.2 Assuming this scheme as theoretical framework, some empirical analyses have been recently realised, aimed at figuring out the extent of these compensation effects associated with labour saving technological change. These studies contribute to identifying both the factors at the basis of the *virtuous circle favourable to employment* and those which have instead contributed to its exhaustion. Among the studies which assume the French school of regulation as theoretical framework there are contributions of one of us (Pini, 1995, 1996, 1997a). We would like to resume some of the findings of this empirical research on aggregate industrial performance for a significant set of Oecd countries<sup>18</sup>. The main aim of this research has been the identification of sub-national and time specificities which characterised the productivity and demand regimes, as well as the related employment dynamics. Thus, it was possible to identify some of the factors explaining first the strengthening of a *virtuous circle favourable to employment*, and then its exhaustion in the last decade.

<sup>16</sup> See Appelbaum – Schettkat (1995, 1996) for some interesting results showing the recent changes in the relationship between demand, productivity and employment in industrialised countries.

<sup>17</sup> See Boyer (1988), Boyer - Coriat (1987), Boyer - Petit (1988 e 1989), and more recently Boyer (1997). For comments, see Pini (1992) and Vivarelli (1995), and also Vivarelli - Gatti (1995).

<sup>18</sup> Namely, we consider the G7 countries, plus Belgium and the Netherlands, for the period 1960-1990.

2.3 *The first phase of the applied research takes as its starting the first approach of the French school of regulation, based on external causation mechanism.*

The core of the model is represented by the interaction between the dynamics of demand, productivity and exports (equations 1.1-1.5). The employment dynamic is the composite result of this interaction. In this process, productivity increases are realised with a heavy contribution of the process of capital formation which, in turn, is influenced positively by growth in demand. The investment ratio thus plays a central role in the dynamics of growth. It is the basis of the productivity dynamic which influences growth in demand by means of an external causation mechanism (exports) and at the same time is stimulated by the dynamics of the growth of the economic system. A large number of specific factors, considered by the model as domestic exogenous variables, characterise this interrelation, which takes place within specific economic systems and within particular temporal periods. First, the internal demand dynamic of a specific economic system influences, along with endogenous exports, the overall dynamic of aggregate demand. Second, exports are influenced also by the changing degree of openness of the economic system to world markets dynamic and the exchange rate, the latter hypothesised as an indicator of exogenous change in the competitive position of a particular country on the international market. Finally, both the process of capital formation (and thus also productivity increases) and the export dynamic itself are influenced by the innovation activity input variables (the former) and output variables (the latter), which represent the functions carried out by the intensity, direction and results of innovation activity. From this the two equations representing the productivity regime and the demand regime (eq.1.6-1.7) can be derived.

2.4 The results of the econometric estimates would appear to confirm the interrelation between growth in demand, productivity and employment which was hypothesised by the external causation growth model (table 4).

A. The results of the regressions of the structural form and the derived reduced form for

the different models concerning the specific output variables of the innovation process used show that both the causal links, from productivity to demand and from demand to productivity are confirmed. On the one hand, in fact, the investment ratio is influenced positively by the growth in industrial value added and appears to give rise to negative effects on the industrial employment dynamic. On the other, the productivity dynamic gives considerable stimulus to exports, and thus to the value added and industrial employment. There are, then, two contrasting effects on employment, the first of which can be seen in terms of an effect of substitution resulting from technical progress incorporated in capital goods, the second in terms of a compensation generated by the growth in demand resulting from technical progress. In particular, the effects on dynamic returns to scale on productivity (mediated by the investment ratio) are negative on the employment dynamic. Alongside this, however, the positive effect on employment resulting from the growth in value added resulting in turn from higher exports due to increases in competitiveness should also be noted.

B. These causal links are also confirmed by the operation of the input and output variables of the innovation process examined which have important effects on the interrelations between demand, productivity and employment. In particular, the variables used as indicators of the input of innovation activity (expenditure in research and development) stimulate the investment ratio and thus negatively influence industrial employment, while variables used as indicators of the output of innovation activity have positive effects on the export dynamic, thus compensating for the previous negative effects on employment. The innovation process would thus appear, on the one hand, to give rise to negative effects on industrial employment to the extent that they stimulate a higher investment ratio in fixed capital, but on the other to permit direct and indirect increases in productivity which favour exports and thus compensate for the previous negative effects.

C. A third consideration concerns the stability of the model. As regards the analysis of possible structural breaks, the stability of the model was examined for the cycles preceding and following the mid-1970s, showing relative *temporal*

*instability* (table 5). As regards the possibility of a temporal break in the mid-1970s, it appears fairly certain that compared to the pre-1975 phase, the later one is lacking in two senses: the input of innovation activity has no positive effects on productivity, and the output of innovation activity has no positive effects on exports, thus giving rise to a contemporaneous decrease in both demand and productivity growth rates. This cannot, however, be attributed solely to the specific characteristics of the innovation process in the pre- and post-1975 periods, in that the domestic and international stabilisation policies on the demand side in the two distinct periods have certainly played a central role. In fact, there is evidence of substantial decreases in the coefficient of value added in the investment ratio equation and in the coefficient of productivity in export equation, joined by fall in the coefficient of internal demand and of the degree of openness of the economy to foreign market. In terms of the distinction of two temporal phases, before and after the mid-1970s, the differences must be identified above all in their demand regimes: the stabilisation policies on the demand side seem to have heavily penalised the demand regime in the second phase, giving rise to radical decreases in growth rates both in productivity (little more than one percent) and in demand (over two percent). All this has brought about a slight decrease in the coefficient of productivity regime, from 0.602 for the pre-1975 to 0.566 for post-1975, and a substantial fall in the coefficient of demand regime, from 0.404 for the pre-1975 to 0.212 for post-1975.

Thus, the empirical analysis has confirmed on the one hand the important negative effects on employment of the innovation process through the accumulation of physical capital (stimulated also by expenditure in research and development as inputs of the innovation process), but on the other also the existence of other equally important compensation effects in terms of the export dynamics which are directly and indirectly stimulated by the innovation process (by the productivity dynamics and by specific output indicators of the innovation process).

However, the first phase study did not deal directly with other important mechanisms of the reabsorption of unemployment which intervene in the determination of the demand regime, in that in

the model of external causation internal demand is dealt with exogenously. In fact, the model does not permit us to evaluate the role of other very important compensating factors such as the income compensation effect resulting from modifications in the level of nominal incomes and their distribution among the different categories of income earners. This important shortcoming is largely due to the exogenous treatment of the internal demand. The need to take into account income compensation mechanisms mediated through the change in the internal components of demand therefore leads us to apply a cumulative growth model of an integrated kind, in which both external and internal causation mechanisms are present.

*2.5 The second phase of the applied research takes as its starting point the second approach of the French school of regulation, based mainly on internal demand components, and aims at integrating the internal causation mechanism with the external one.*

Thus an *integrated model* of the two well-known models identified as “internal causation” and “external causation” is proposed. The former is based on the identification of the factors of internal demand which set off the process of cumulative growth and influence the medium-term growth path. In this area we pay special attention to the income distribution determinants of the dynamics of investment and of internal consumption. The latter is based on the identification of the driving role of export dynamics which, given the dynamics of the internal components of demand, are positively affected by increases in productivity (equations 2.1-2.10). From this the two equations representing the productivity regime and the demand regime (equations 2.11-2.12) can be derived.

The core of the internal causation mechanism lies in the way the various components of aggregate demand, mainly private consumption and private investments, are stimulated by the growth in real incomes and by the changes in their social distribution which follow from productivity increases. As a matter of fact, the benefits of technical progress are distributed between the various social classes of the economic system, affecting the growth paths of aggregate demand and its distinct components, investments and

consumption. Investments depend on the dynamics both of aggregate demand, presupposing the operation of the Keynesian accelerator principle, and of profits, on the basis of a Classical accumulation mechanism. We consider also two other variables, the long-run real interest rate and the degree of capacity utilisation, as proxy of opportunity cost for investment and of pressure of aggregate demand in the short-run. Consumption, on the other hand, is defined by adopting a behaviour hypothesis which is not strictly Classical: it depends mainly on the overall income of the workers and therefore on the dynamics of real wages and of employment, without however excluding an influence of the consumer decisions of the profits earners. The dynamics of real compensations is in turn determined on the basis of a competitive market mechanism and/or of a distributive mechanism of the benefits of technical progress, and is therefore affected both by the degree of pressure of demand on the labour market and by the productivity dynamics. In its turn, the profit dynamics is itself affected by increases in productivity through the distribution mechanism of the benefits of technical progress and also of the actual growth of the value added, according to a mechanism of the Keynesian kind. These mechanisms are coupled with those of the external causation mechanism based on the dynamics of the foreign component of the aggregate demand, exports. These are influenced by exogenous and endogenous factors such as the changing degree of openness to foreign markets, the dynamics of the exchange rate and productivity gains (in so far as they appear in the shape of changes in internal prices rather than in variations in nominal income). The latter affect the terms of trade and thus the competitiveness of national products on foreign markets, besides the results of the innovation process, which influence the non-price competitiveness of national products.

2.6 The integrated model would appear capable of supplying more adequate explanations of growth and employment dynamics if compared to the external causation model, locating in the determination of the demand regime important factors such as the dynamics of incomes following productivity increases and the sensitivity of the distinct private components of demand to these dynamics, which occur in the process of economic

growth in the presence of technological change (table 6).

A. First of all it should be noticed that both the causal links which lead from demand to productivity (productivity regime) and from productivity to demand (demand regime) are confirmed by the estimation of the model. With reference to the productivity regime, the link between the growth of value added, of industrial employment and the investment ratio, and between the latter and the growth of industrial employment, would appear to be confirmed. If on the one hand the value added confirms its positive influence on the pattern of employment, on the other, through the investment ratio, it has a negative influence on the employment dynamics. The latter, still through the investment ratio, is also negatively affected by the dynamics of expenditure in R&D. With reference to the demand regime, the compensation mechanisms of the negative effects of productivity growth on employment, given demand, would seem to be robust both in the external and the internal components of demand. Export growth is stimulated by the productivity increases and by the results of the innovation activity represented by the output variable of the innovation process. The consumption and investment dynamics are positively affected by productivity growth through the positive effects this has both on the income of employees and on operating surplus.

B. The important role played by the input and output variables of the innovation process are also confirmed. With reference to the productivity regime, expenditure in R&D has quite important (positive) effects on the investment ratio and similarly important (negative) effects on the dynamics of employment. The effect on the productivity regime is hence positive, overall. With reference to the demand regime, the different variables of output of the innovation process turn out to be a stimulus to export growth and therefore to value added and to employment, compensating in this way the previous negative effect of the input variable. Such conclusions therefore confirm the results arrived at in the context of the external causation model of cumulative growth.

C. Some significant differences emerge when the results obtained by the integrated model, in

which the internal demand is endogenous, are compared with the previous external causation model.

If we concentrate on the elasticity of the productivity regime and of the demand regime, it is clear that the first coefficient is not substantially dissimilar in the two models, whereas the second is significantly different.

C.1 In the integrated model the productivity regime is marked by a coefficient equal to 0.634, whereas in the estimate for the external causation model it was equal to 0.601. The similarity of the estimates obtained for the two models would seem to be a confirmation of the strength of the results obtained with reference to the determination of the relations concerning the productivity regime.

C.2 This similarity on the other hand would not seem to be evident when we turn to the demand regime. Here the elasticity of the demand regime is substantially higher in the integrated model (0.928) when compared to the external causation model (0.372). In fact the integrated model allows us to capture endogenous growth mechanisms which are absent in the external causation model, and which are mediated by the effects of the productivity increases on the real income growth of the social classes referred to, the wage and profit earners, on the alteration of their distribution between these two categories and on how this influences the pattern of the endogenous components of demand, private consumption and investments.

C.3 In particular, the private consumption component is considerably affected by the dynamics of the total compensations of the employees, and to a considerably lesser extent, by the dynamics of the operating surplus. The investments component in its turn is positively influenced both by the growth of value added and by the growth of the operating surplus, even if this latter variable has less influence compared to those of the first variable. In this case therefore there is confirmation of the presence of a strong leading influence on investments of the value added growth in comparison to the role played by the profits dynamics, which would seem to suggest that a Keynesian-type regime prevails over one of a Classical type, even if the latter is by no means insignificant. With reference to the sharing of the

productivity increases over incomes, the results obtained show a significant link between productivity growth and the growth of real earnings per person employed, on the one hand, and productivity increases and growth of the operating surplus on the other. Sharing mechanisms of productivity gains for both income categories would thus seem to emerge, without any particular "bias" in favour of either category. Moreover, the degree of competitiveness of the labour market would seem to take on a significant role in the determination of the earnings dynamics, as can be seen by the effects created by the rate of unemployment variable. In this sense the presence of a regime of the Classical kind on the labour market cannot be ruled out. Finally, there is evidence that the operating surplus dynamics is not just influenced by productivity growth but also by the value added growth, albeit less so.

The results arrived at with reference to the demand regime would therefore appear to indicate the presence of specific internal causation mechanisms which sustain growth, as well as the external causation mechanisms sustained by exports, which have already been mentioned. Wages increase with the growth of productivity, and if this favours the total wage bill (because of the only slight negative effects of productivity on employment given value added) consumption rises and hence also the value added, which in its turn sustains the growth of investments. The latter are also stimulated by the growth of profits brought about by the growth of productivity, but more so by the growth of value added. A demand regime would appear to emerge which stresses the distribution of productivity gains both to wages and profits, with Keynesian features in the growth regime, which however do not rule out the additional presence of a regime of a Classical kind on the labour market and in the determination of the investments dynamics.

D. Moving on to the relative instability of the model over periods of time, the less favourable interrelations between demand growth and productivity growth in the second period (1975-1990) when compared to those of the first (1960-1975) would appear to be significant (tables 7-8). The elasticity of the demand regime is significantly lower in the second than the first, going from 0.97 to 0.44, while the elasticity of the productivity

regime is much less different amongst the two periods, going from 0.64 to 0.54.

D.1 The analysis suggests also that in the determination both of investments and of real wages from 1960-1975 and 1975-1990 a substantial change in the characteristics of the demand regime took place, i.e. the passage from a Keynesian-type regime to one of a Classical type. Specifically, there would seem to be evidence of a first period characterised by a more Keynesian regime, while in the second a more Classical regime emerges, both in the demand dynamics (particularly investments) and in the distribution of income and the sharing out of productivity gains to profits and wages. The change of the growth regime in demand and distribution could be an important explanatory factor in the lowering of both the coefficients of the demand and productivity regimes.

- a) The lower sharing out of the productivity gains to wages, together with the growth of the rate of unemployment<sup>19</sup>, seems to have penalised the demand for consumer goods and lowered the growth of value added.
- b) At the same time, greater profits (due to the sharing of productivity gains) have stimulated investments to a greater extent and have therefore partly compensated for the previous effect on internal demand.
- c) In any case, with respect to the first period the growth of the foreign component of demand has also turned out to be less of a stimulus to value added.
- d) In addition, a smaller stimulus was found in government consumption.

The overall effects on the demand regime seem however to indicate a penalisation of the link between productivity growth and the growth of demand, insofar as the negative effects on wages and therefore on consumption brought about by the altered regime do not appear to be compensated for by the dynamics of profits, of investments and of the other components of demand (exports and government consumption).

D.2 In particular, concerning the productivity regime, the negative effects of the investment ratio on employment in the second period are greater than in the first (the employment equation). To this must be added the smaller effects of value added on the investment ratio in the second period (the investment ratio equation). Overall, the negative direct effects on employment brought about by the dynamics of the investment ratio are therefore greater from 1975-1990 than for 1960-1975. These effects are compensated for partly by the relatively greater sensitivity of employment to value added in the second period (the employment equation).

With reference to the role of the input and output variables of innovation activity, it would appear that from 1975-1990, as compared to 1960-1975, the positive effects of the input variable on productivity (through the investment ratio) and the positive effects of the output variable (the patent auto-sufficiency ratio) on value added through exports are absent or considerably lower (in any case not significant). For the second period the double weakness of the driving role of the input and output variables of innovation activity - already shown by the estimates of the external causation model - which contributes to the simultaneous reduction of the coefficients of the productivity and demand regimes, determining in this way a lower growth ratio in these variables, would seem to find confirmation.

When we consider more carefully the demand regime, significant changes emerge in the role played by the variables which influence the dynamics of investments, of real wages, and of operating surplus.

- a) Comparing the first and the second period a greater sensitivity of investments with respect to operating surplus would seem to emerge, while that regarding value added would seem to diminish. This could be interpreted as the passage from a Keynesian to a Classical regime in the determination of the demand component. In addition, the long-run real interest rate shows an higher significance in the second period with respect to the first, and the same could be said with reference to the degree of capacity utilisation, which was non significant in the first period. This last result could appear quite significant if we considers the growing role assumed in the eighties by the

<sup>19</sup> This result is also confirmed for a group of OECD countries in a recent empirical analysis by Vivarelli - Montobbio (1996), which analyse different regimes determining the formation of real wages (Keynesian-fordist regimes vs. - Classical-competitive regime) in two different periods of time.



financial market and the internationalisation process of capital markets, guaranteeing real rate of return higher than those deriving by investment in real activities.

- b) As far as the influence of productivity on the dynamics of incomes is concerned, there are two particular issues: i) the positive link between the dynamics of real wages and the productivity dynamics turns out to weaken significantly in the second period, while the rate of unemployment, not particularly important in the first period, affects wages considerably in the second period; ii) in the second period the strongly positive link between the operating surplus dynamics and productivity would seem to be strengthened, while the explanatory capacity of value added in the determination of the operating surplus disappears. There would therefore seem to be some evidence that while in the first period productivity had a positive influence on wages rather than on profits, in the second period the opposite happened.

The analysis carried out has allowed us to show how in the determination of the effects of technological change on the volume of employment it is essential to consider together the changes that occur in the dynamics of both supply and demand.

The dynamics of employment, in fact, is the result of the interaction between the productivity dynamics and its effects on the supply side and of the demand dynamics and its specific components, the result of those same productivity increases. It can be seen from this that high rates of growth of labour productivity do not necessarily imply less employment growth, and this is confirmed by the experience of all in the countries under consideration from the start of the sixties to the crisis phase half-way through the seventies. At the same time, even reduced productivity growth rates where accompanied by similarly reduced demand growth rates can be associated with low or even negative employment growth rates, and there is evidence for this in the same countries in the period following the mid-seventies. At the same time the analysis has shown that the interaction between productivity and demand has specific relevance for periods, demonstrating the way that after the mid-1970s such interaction has turned out to be less favourable to employment compared to the previous period.

The integrated model utilised in this paper would appear capable of supplying more adequate explanations to such dynamics if compared to the simpler external causation model, locating in the determination of the demand regime important factors such as the dynamics of incomes following productivity increases and the sensitivity of the distinct private components of demand to these dynamics, which occur in the process of economic growth in the presence of technological change.

### 3. The “employment multiplier”: some evidence for the nineties

3.1 The previous results, obtained for the two phases marked by the breakdown of the mid-seventies, emphasise that jointly with the worsening of the productivity regime, potentially favourable to the employment performance for any given demand growth, an even more relevant worsening of the demand regime has occurred too. These changes were characterised by the following factors:

- a) a weak dynamic for some domestic components of aggregate demand which played an important role in sustaining the growth regime until the mid-seventies;
- b) in particular, the breaking down of the *labour nexus* between real wages and productivity, and the emerging of a more competitive labour market regime in the process of compensation settlements which affected negatively the dynamic of private domestic consumption;
- c) a minor role played by government expenditures in sustaining domestic demand growth;
- d) changes in the primary distribution dynamic, more favourable to non-labour income and to profits, with stimulating effects on private investments;
- e) a major role played by financial variables in capital markets, such as the real interest rate whose increase brought negative effects on investment in physical capital and real activities in general;
- f) the confirmation of propelling mechanisms on the export demand side, which however do not appear to be strong enough to

compensate the weakening of domestic demand.

In the more recent years, changes in the sphere of income distribution adverse to workers seem to be intensified in several industrial countries (ILO, 1995, 1996; EC, 1996). These changes, together with very favourable dynamics in labour productivity not associated with similar adjustments in real wages, appear to have brought about important effects on the composition of aggregate demand, penalising its domestic components, in particular consumption, and thus the employment performance.

In this section we propose, for the period 1991-1995, a quantitative assessment of the impact of demand side factors, i.e. growth, composition and distribution of income, on the determination of changes in the aggregate balance of employment.

The level of employment warranted in a system is derived from the application of a simple scheme which we have called, following the contributions of Richard Kahn and John Maynard Keynes, the “employment multiplier”. Starting from an accounting identity between the values of aggregate supply and demand, a level of warranted employment is derived, given the labour coefficient and the deflated values of final demand. In final demand, autonomous components are distinguished from an induced component, which depends on total labour income (Piacentini, 1995, 1997). Thus, the variations of aggregate employment for a country can be decomposed into the effects of the contributions of three components:

- a) the technological progress as witnessed by the reduction over time of a labour coefficient of output (the inverse of average productivity of labour);
- b) growth and composition of autonomous demand;
- c) variations of the “multiplier”, which summarises the impact of wage share and consumption propensity on induced demand and thus on the level of overall employment,

It is worth resuming and verifying two aspects which should help interpreting the poor employment performance of the European countries:

1. the explicit consideration of the dynamic of autonomous demand components, assumed in a Keynesian fashion as the primary source of the income-expenditure circuit;

2. the twofold role of wage dynamics, as structural element of the supply cost, on the one hand, and as multiplicative component of demand induced by consumption out of labour income, on the other.

The approach we follow intends to resume the original version in accordance to which *employment essentially derives from final demand*<sup>20</sup>, given the state of technology. At the same time final demand itself, through the capability to generate an induced demand out of labour income (given the transferring mechanisms of productivity gains on real wages), interacts with the dynamic of employment level. As in the simple income-expenditure model, in which the exogenous components of demand determine the equilibrium level of income given the multiplier parameters for the induced demand, similarly, it is possible to obtain the employment level “warranted” on the basis of the level and composition of autonomous demand - domestic and external - , and of the technical coefficient of production (summarised by the aggregate product per worker ratio), given real wages and the propensities to consume out of labour income as parameters of the induced component of demand for labour.

Following Keynes, we can distinguish two demand components which generate employment: the first is linked to the demand for consumption goods which is connected to the employment level itself; the second is an autonomous component affected by interest rate and marginal efficiency of capital, which are considered initially as independent variables (Keynes, 1973a, pp.481-483). Thus we have an employment function depending on an induced component and on an autonomous component of final demand.

This Keynesian view is also found in the seminal article by Richard Kahn (1931) in which employment is distinguished in two components: a “primary” component activated by the exogenous components of demand, and a “secondary” component induced by the consumption out of wage bill in the income-expenditure circuit (Kahn, 1931, p.173). The “secondary” component emphasis also, in Richard Kahn argument, the role of real wage dynamics as multiplicative element of a induced demand for consumption goods, then not

<sup>20</sup> See Keynes in *The General Theory*: (Keynes, 1936, ed. 1974, p.24).

only as cost element of the supply price borne by firms.

Then, the wage bill and labour compensations have a twofold role, as to determine the supply price for goods, on the one hand, and to multiply an autonomous demand, on the other. A partial view of wages as purely cost element to be reduced in order to gain competitive advantages could jeopardise the capability of the multiplier to induce an internal demand out of labour income and thus to sustain employment level. Keynes emphasised this crucial element in Ch. XIX of *The General Theory* in which, debating the induced effects of a decline in wage rate, he noticed that a consequent income distribution adverse to workers (and favourable to *rentiers*) could imply negative effects on employment, rather than positive ones, for the decline in consumption for workers and the increase in saving for *rentiers* (Keynes, 1936, ed. 1974, p.262)<sup>21</sup>.

An approach which considers employment activation as an outcome “a posteriori” with respect to volumes and composition of a final demand might appear, at first, heterodox within the orientations of macroeconomic analysis prevailing at the present time<sup>22</sup>. We are not denying, in the occasion, an intention of encouraging a critical consideration of the relevance, for the medium-term performance of employment, of factors on the “demand side”. We believe, however, that an empirical re-examination of the relationship between the dynamic of components of final demand and employment should not, in principle, constrain to a particular viewpoint upon the direction of causation of demand for labour, or of “regimes” of wage or price determination.

The approach which follows is, thus, directly inspired from the sequence outlined by Keynes in Ch.3 of *The General Theory* and by Kahn in 1931. We assume indeed as our point of departure the aggregate identity between value-flows of aggregate supply and demand. The derivation of a solution for a “warranted” volume of employment

follows then from simple algebraical manipulation respecting the basic identity. We arrive thus to an expression which will be used as a basic ingredient of an “employment accounting” exercise, rather than to be interpreted as a reduced form of a model, casually or sequentially explicated. Within these analytical boundaries, we believe however that the approach will prove to be of heuristic interest in the rationalisation of different performance of employment growth among countries, or among different periods and cyclical episodes within each country (Chart 6).

3.2 On the basis of this framework, we have worked out a quantitative assessment with temporal comparison within a national and international context. The aim has been to rebuild the employment pattern for a group of OECD countries “warranted” on the factors indicated above, with specific timing (cycles and decades) in the period 1960-1995 required in identifying differential behaviours of the relation between employment growth and production growth (Piacentini - Pini, 1997).

Our quantitative approach provides some interesting and original evidence about the effects of the “multiplier” of induced demand on employment dynamics. In fact, the following main factors contribute to changes in the employment multiplier and then to the employment elasticity of growth: a) changes in labour market regimes and labour market regulations, affecting the pattern of real compensations with respect to productivity gains, b) constraints on macroeconomic policies and income policies which shape the timing between nominal wages, productivity and prices. In our exercise, logarithmic differences over intervals of time have been calculated decomposing the variations of employment as contribution of three factors: a) changes in labour productivity (or its inverse, labour coefficient PRINV); b) changes in the autonomous demand in real terms, augmented by the volume of consumption out of non-labour income (AAC); c) changes in the “multiplier” (MPL). For the last term, we have calculated its dynamic through the pattern of real compensations (RW), labour productivity (PR) and the aggregate consumption/income ratio ( $c_y$ ). Given the use of  $c_y$ , the differences between the calculated employment

<sup>21</sup> See also Keynes (1930a; 1932, in 1973b, vol. XIII, pp.343-373; 1939) and the essay *The Question of High Wages* (Keynes, 1930b).

<sup>22</sup> The latter would rather derive “a-priori” (or equilibrium) levels of employment, or unemployment, from models of behaviour of agents on an aggregated labour demand, described in situations, broadly defined, of imperfect competition. We refer, in particular, to a scheme which defines an equilibrium rate for (un)employment (NAIRU, etc.) through interactions of “wage equations” and “price equation” emerging on an idealised “real wage-employment” plane, i.e., in a context of partial equilibrium analysis for labour market.

dynamic and the effective one represents the residuals (RES)<sup>23</sup>.

We present here some of the results obtained for seven OECD countries<sup>24</sup>, commenting upon the decomposition of employment pattern for the first part of the nineties, and comparing it with the pattern of the previous decade (Graph. 1 -2)<sup>25</sup>.

In the first five years of the nineties among the countries we have considered there is evidence of a pronounced difference in the employment performance of the two non-European countries with respect to the European ones. In fact, the United States and Japan show positive employment dynamics, confirming the pattern of the previous decade. On the contrary, European countries are characterised by a fairly negative employment dynamic, or at the best, no change in the employment level in the period 1991-1995.

The positive employment dynamics for the United States can be explained by two factors. The first, in order of importance, is represented by the steady excess of the growth of autonomous demand components<sup>26</sup> over the dynamic of product per worker, which has been relatively low with respect to international standards. The second factor is the contribution of the multiplier that, although quite small, has been always positive. Among the autonomous components of demand, the dynamic of private investment has played a major role in the period 1991-1995, compensating for the negative influence provided by public and foreign components. At the same time, there is evidence of a positive influence provided by consumption out of non-labour income. In addition, the multiplier dynamic appears more favourable in the nineties than in the previous decade, as a consequence of a growth rate in both real compensations and the aggregate

consumption/income ratio higher than the one in labour productivity<sup>27</sup>.

The employment performance for Japan seems instead to be explained by factors different from those affecting the USA performance. In the nineties, the economic stagnation in Japan, with the "Heisei slump", has been characterised by a zero growth rate for autonomous demand and by very low productivity gains according to Japanese standard. The gap between autonomous demand growth and productivity growth has been negative, about 2 percentage points. Nevertheless, the employment dynamic remains slightly positive (+0,67% per annum), as a result of the contribution of the multiplier (+1.42% per annum): the rise in the aggregate consumption/income ratio is the main factor explaining the increase in the multiplier, while the compensation dynamic appears to be only slightly higher than productivity gains. This result probably reflects the impact of economic policy aimed at realising a recovery in domestic private consumption out of labour income, both as a short-term policy and correction of a too high foreign trade balance surplus. There is evidence, in fact, of a positive contribution from public components of demand, while private investments and domestic consumption out of non-labour income show a significant stagnation.

Among the European countries considered, Sweden, the United Kingdom and Italy are those that show the poorest employment performance over the period 1991-1995, while France and West Germany present nearly steady employment patterns (Chart 7).

In the first three countries the contribution of the multiplier appears significantly negative: -2.3% for Sweden, -1.38% for the United Kingdom and -2.17% for Italy. The real compensation dynamic has been much lower than the productivity dynamic, negatively affecting the multiplier: the gap between  $\pi$  and  $w/p$  has been -2.2 in Sweden, 1.5 in the United Kingdom and 1.9 in Italy. In these countries, most of the employment losses can be explained by changes in the multiplier. In Sweden, a relatively weak growth in the autonomous components of demand has been added to the changes in primary distribution favourable to non-labour income, together with a

<sup>23</sup> The statistical source is OECD (1996); for details see Piacentini - Pini (1997).

<sup>24</sup> The countries considered are: the United State and Japan, as industrialised non-European countries, and the United Kingdom, West Germany, France, Italy and Sweden for Europe. For a more accurate presentation of the results for the whole period 1960-1995, see Piacentini - Pini (1997).

<sup>25</sup> The comparison between the eighties and the nineties is not presented in the graphics, but only in the text. See Piacentini - Pini (1997) for more details.

<sup>26</sup> The decomposition analysis for the autonomous components of demand show: (a) a minor role played by foreigner component; (b) a strong impulse of private investment in the seventies and eighties; (c) a pronounced recovery of the private investment in the nineties; (d) a significant role played by consumption out of non-labour income in particular in the eighties; (e) positive effects of government expenditures in the sixties and eighties, but non remarkable in the seventies and nineties.

<sup>27</sup> However, it is worth to notice that also in the nineties the change in income distribution has been adverse to labour, at least on the basis of the gap between productivity growth and real compensations growth.

strong recovery in productivity growth. The weakness in autonomous demand has been induced mainly by three factors: a) the slump of private investments; b) zero growth in government expenditures; c) a pronounced rise of net-export demand which does not appear adequate to induce the necessary compensations. In the United Kingdom and in Italy, the autonomous components of demand play at least a partial compensation role with respect to the primary distribution changes. In both countries, the net-exports show the major positive contribution to aggregate demand growth, together with the growth of private consumption out of non-labour income, while private investment and government expenditures present worse dynamics with respect the previous decade.

Vice versa, in West Germany and France, the employment stability in the years 1991-1995 seems to be associated with very small changes in the multiplier, together with a dynamic for the autonomous components of demand very similar to productivity gains. The lower income growth in these countries does not seem to produce large negative effects in the labour market, as it does in the previous three countries. In West Germany, the gap between productivity growth and real compensation growth is within 1 percentage point, while in France it is even less (0.5%), with distributional effects not very favourable to non-labour income. In the German case there is also evidence of a rise in the aggregate consumption/income ratio, with a relevant compensation effect on employment, while within the autonomous components of demand no significant change emerges with respect to the previous decade, except for a fairly lower contribution of private investment and private consumption out of non-labour income. In France, on the contrary, the composition of autonomous final demand shows greater changes: the contribution of private consumption is quite small and the one of private investment is even negative, while net-exports show a much better dynamic with respect to the previous decade. Thus, in these two countries the dynamic of foreign demand does not seem capable of strongly supporting the growth of induced demand, even though this is still favourable as the multiplier remains stable as a consequence of almost steady distributional dynamics., i.e. not very favourable to non-labour income.

3.3 A more adequate comment on these results would require more detailed evaluations on the pattern of primary and secondary distribution of real income for each country. However, it is worth making clear a background consideration on the basis of the analytical scheme we wanted to keep as elementary as possible<sup>28</sup>. In the interpretation and forecasting of employment patterns, the incidence of the “induced” component of demand, to which the dynamic of real disposable income contributes critically - specifically labour income -, cannot be neglected. Macroeconomic policies and income policies, which, given the necessity to control inflation and to pursue monetary stability and international competitiveness, “freeze” the transfer of productivity gains into disposable income for a major part of the population for a prolonged period, would run the risk of lowering the potential for the demand multiplier, thus dampening the possibility of exploiting the employment elasticity of growth during the recovery. A positive dynamic of autonomous components of demand, in particular of the external demand, does non appear to be capable in itself of supporting the employment level, at least recently, obviously taking into account the labour saving effects provided by productivity increases.

We think that this message should apply, beyond the specific evidence for the countries examined, to the diagnosis of “employment sclerosis” in the European context and even in a broader scale.

The United States and Japan have actually been able to maintain positive employment performance also in period of relative low growth in income in the eighties and nineties. There is evidence, for these countries, of some capacity to compensate the slowing phase of the cycle with the rising of induced components of demand, traceable to behavioural and distributional factors, but also with fiscal incentives which could have positively affected the propensity to consume in the “multiplier”.

Vice versa, on the basis of the negative evidence for a specific area of the European Union, the following idea is strongly reinforced: there has

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<sup>28</sup> Taking as our departure point the Keynes’ methodology, as remarked by Kaldor: “[...] a way of approaching the economic problem, focusing attention on the relationships between a limited number of strategic aggregates” (Kaldor, 1960, p.1).

been an underestimation of the negative impact of prolonged stagnation in the capability to consume out of labour income for preserving the employment level gained in the past, and in addition an overestimation of the compensation capacity provided by exogenous component of demand, specifically net-exports.

#### 4. Final remarks

Which is the message provided by these analyses, not only from the analytical point of view but also in terms of policy options ?

We summarise it in two main points.

1. In evaluating the more recent employment performance, the *demand side* of the market cannot remain neglected, as the attention placed on the supply side hangs over the today's economic and policy debate. This message might appear even too Keynesian if it is judged within the mainstream approach in economics. According to our view, however, it is impellent to reintroduce the macroeconomic Keynesian view in the today's debate which is too bounded to the idea that there are no feasible alternatives (Fitoussi, 1995; Galbraith, 1996) on the ground both of economic analysis and of policy options. The end of the Keynesian-Fordist paradigm has brought about important adverse changes in the positive relationship between non-financial capital accumulation and income distribution, and between employment and production (Lunghini, 1995, Pini, 1997b). On the one hand, it seems reasonable to consider demand growth as a *not-sufficient condition* for having job creation. On the other hand, however, the demand growth itself appears still a *necessary condition* for having favourable employment performance<sup>29</sup>. Demand policy cannot neglect this point.
2. In addition, the supply factors play an important role not only in the determination of the competitive position of the firms both in domestic and foreign markets, but also for

their *distributional consequences*, and then for the effects generated on the components of domestic demand. A policy, which contributes to generate a *growing gap* between benefits deriving from technical progress and their social distribution to specific income earners, can certainly rise the capacity to enter foreign markets. At the same time, however, the widening gap between labour compensations and average labour productivity runs the risk to induce perverse effects on the domestic components of demand given the absence of inflation pressure.

Thus, as far as economic growth is concerned, policy on the demand side as well as distributional policy of productivity gains on the supply side should be reconsidered either as complementary options, or substitutes, of the prevalent microeconomic policy aimed at restraining the supply costs as well as macroeconomic policy aimed at pursuing monetary and financial stability.

#### Abbreviations

EEXRG	Variation rate of effective exchange rate
EIG	Rate of growth of industrial employment
EISYG	Rate of change of the ratio exports plus imports and internal domestic product, at constant prices
EXPG	Rate of growth of industry exports, at constant prices
GCG	Government consumption growth, at constant prices
ICUG	Rate of change of capacity utilisation index, industry
IDG	Rate of growth of domestic demand, at constant prices
ILPG	Rate of growth of labour productivity in industry
ISY	Share of fixed investment out of gross national product (investment ratio), at constant prices
ISYJ	Dummy variable for Japan in the investment equation
MEG	Rate of growth of machinery and equipment investment, at constant prices

<sup>29</sup> Considering the debate on disguised unemployment, a similar argument will apply: "The rate of growth of effective demand is everywhere too low relative to the growth of sector [with high] productivity, and steps should be taken to remove the constraints to the expansion of demand by appropriate mix of fiscal and monetary policy" (Eatwell, 1997, p.92).

PAT-ASR	Patent auto-sufficiency ratio (domestic/national applications)
PCG	Private consumption growth, at constant prices
PFIG	Private gross fixed investment growth, industry, at constant prices
OSG	Operating surplus growth, industry, at constant prices
R&DGP	Rate of growth of total research and development expenditure (previous cycle), at constant prices
RLIR	Long run real interest rate
RWG	Growth of compensations for employee, industry, at constant prices
UR	Unemployment rate
VAIG	Rate of growth of value added in industry, at constant prices
WBG	Growth of wage bill, industry, at constant prices
ARSQ	Adjusted coefficient of determination
DF	Degree of freedom
F TEST	F distribution test
HWTY	White test for heteroskedasticity using fitted values of dependent variable $y$ and $y^2$
HBPT	Breusch and Pagan test for heteroskedasticity using regressors $x_i$ , $x_j$ , $x_i^2$ , $x_j^2$ and $x_i \cdot x_j$
HT TEST	Hausman test
IV	Instruments variables, TSP 4.2b
N	Number of observations
RSQ	Coefficient of determination
SBT	Spencer - Berk exogeneity test
SER	Standard error of the regression
SSR	Sum of square of the residuals
2SLS	Two stage least squares, TSP 4.2b
3SLS	Three stage least squares, TSP 4.2b

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## Charts

*Chart 1: Aggregate employment elasticities of growth*

Among European countries, West Germany and the United Kingdom are the economies where employment elasticities have been increasing during the positive cycle of the mid-eighties. In these years the elasticity shows its highest values, about 1/2 percentage point, for all the cycles in the period 1960-1995. It means that, in the most favourable circumstances, only half of the growth in income has been translated in overall employment growth.

If we consider broader intervals (decades), it is worth pointing out that in the eighties and beginning of nineties the elasticities assume much lower values. In the United Kingdom, they are about 1/7 percentage point<sup>30</sup>, while in West Germany they present fairly higher values, about 1/3<sup>31</sup>, but lower than those in the seventies. However, the employment performance in West Germany appears characterised recently by a much better pattern with respect to the previous periods, as it seems confirmed by the dynamic in the last cycle 1990-1995. In this last period, the United Kingdom reveals instead a decline in the employment intensity of growth, at least until 1995.

The performance of the other three European countries seems, instead, to indicate a quite pronounced worsening of the employment intensity of growth. Both in Italy and in France the elasticity halved in the eighties and beginning of nineties with respect to the values of the seventies, falling to about the level of 1/10 percentage point. In particular, the mid-eighties period does not mark a recover of the employment elasticity that it was perhaps legitimate to expect. In Italy, the elasticity halved with respect to the previous cycle even when characterised by low income growth<sup>32</sup>. While in France, the elasticity was near zero<sup>33</sup>. The case of Sweden is even worse, being characterised by employment losses in the eighties and beginning of nineties, so that the values of elasticities become negative even when there were positive changes in income. However, even if we do not consider the very poor employment performance in the last cycle for this country, the employment elasticities in the eighties are lower with respect to the previous decade, exactly in the same period in which income growth was higher.

With reference to the timing of employment elasticities (not to the levels), the previous evaluations can be applied to the United States and Japan too. The case of the United States is characterised by a decline in the employment elasticity of growth in the eighties and the beginning of nineties, with respect to the seventies; it goes from the starting level of 3/4 (and about 1 after 1973) to an elasticity slightly higher than 1/2. The case of Japan presents, instead, an elasticity slightly increasing (about 1/10 percentage point), in the period following the seventies. However, this trend mainly depends on the changes occurring at the end of eighties and beginning nineties<sup>34</sup>. While if we consider the four cycles from 1973 to 1988 there is evidence of elasticity almost constant, about 1/5.

*Chart 2: Employment elasticities in primary and secondary sectors*

In the first cycles of the whole period 1960-1995, the values of the elasticities, when positive, are extremely low, less than 1/10. The only exceptions are the United States and Japan, which reveal initially significant positive elasticities for manufacturing sectors and other industrial sectors, higher than 1/4, which are nevertheless declining in the following cycles<sup>35</sup>.

In the European countries, the employment elasticities of growth are negative for most of the cycles in the seventies and thereafter, with some positive values which are nevertheless decreasing over the cycles. It is worth pointing out the experience of two countries in which the share of manufacturing sectors, and of industry in general, is relatively very high: West Germany and Italy. In West Germany, the second half of the eighties represents certainly a period in which the growth of the economy has brought about a pronounced employment recovery: almost half of value added growth has been translated into new jobs. In the case of Italy, instead, the employment elasticity was higher in the seventies, about 1/5, while in the eighties the performances of labour market has been very poor, with negative employment dynamics<sup>36</sup>. However, West Germany in the seventies and eighties and Italy in the seventies represent the only significant exception showing a positive correlation between production growth and employment dynamics. Finally, it is worth noting as in the nineties we have negative elasticities in a period in which value added is growing sharply in manufacturing. This evidence is confirmed also in the case of the United Kingdom, France and Sweden: there are no indications of positive correlation between production and employment, and employment losses are larger cycle after cycle.

<sup>30</sup> Similar to the seventies ones.

<sup>31</sup> For this country, the nineties are characterised by a relative employment intensity stability of growth.

<sup>32</sup> In Italy, indeed, the cycle 1979-1984 has been characterised by a lower value added growth than the one for the subsequent cycle, 1984-1988 (the difference is greater than 1 percentage point per annum), while the employment performance is similar in the two cycles (in this case the difference is less than 3/4 percentage point per annum).

<sup>33</sup> In the eighties, in France income growth (higher than 2% per annum) entirely translates into productivity growth, which implies quite strong *Jobless Growth* evidence.

<sup>34</sup> In this period the annual growth rate of income does not decline with respect to the previous cycle, and the employment presents a slightly better performance.

<sup>35</sup> However, in these two countries the employment elasticity in non-manufacturing sectors does not present a negative pattern. In Japan, there is evidence of an increasing employment elasticity over the whole period, while in the United States the values of the elasticity are extremely high in the third and fourth cycle, given the very favourable employment dynamics in the construction sector.

<sup>36</sup> The employment elasticity in the seventies is largely influenced by the elasticity value in the 1976-1979 cycle. In this cycle, in fact, notwithstanding a much lower growth rate of value added than the early seventies (given the 1975 downturn) the employment is nearly stable, as firing is not high and much less intense than in the subsequent cycles.

*Chart 3: Demand and productivity in the cumulative growth model*

The conceptual structure of the cumulative growth approach is based on a few fundamental propositions whose articulation and specification is at the origin of particular post-Keynesian model of growth. These propositions are the following:

(a) the productivity growth rate depends principally on the production growth rate, thus focusing attention on the partially endogenous character of the appearance of technical progress and the importance of dynamic returns to scale;

(b) the demand growth rate is influenced by the productivity growth rate, thus highlighting the potential role both of distribution mechanisms, and of factors of price competitiveness which govern the demand dynamic, by examining the transmission channels of productivity gains over real income.

These propositions characterise the process of cumulative growth as a process of interaction between increases in demand brought about by increases in supply generated in response to increases in demand (Kaldor, 1966). Sustained growth gives rise to effects which stimulate its own progress, thus setting off a virtuous circle of growth based on dynamic returns to scale. At the same time, low growth inhibits growth itself, setting off in this case a vicious circle of decline which progressively slows growth both in demand and in productivity.

Propositions (a) and (b), the basis of the cumulative growth process, constitute two distinct sequences of causal relations which characterise the post-Keynesian model of growth. They represent a solution for a macroeconomic model which links different endogenous and exogenous variables: the sign and intensity of these relations are not specified *a priori*, being determined by the specific values of the structural parameters of the model which represents the technical and economic behavioural relations.

The productivity dynamic set up by proposition (a) (the causal relation which runs from production to productivity) is specified in the cumulative growth model as depending fundamentally on three factors: (1) the investment dynamic which, incorporating new technologies resulting from innovation activity, modifies production techniques and the capital/output relation; (2) the pattern of the aggregate demand for goods on the basis of a relation which renders explicit the returns to scale in the economic system; (3) the intensity of research activity for new technological solutions in the production of existing goods or the invention of new goods.

Technological change is, then, determined partially. On the one hand it is brought about by the demand dynamic as in the case already illustrated, according to a model which emphasises the role of market size and its expansion, presupposing the existence of Kaldor-Verdoorn dynamics returns to scale. On the other, it occurs mainly as a result of the adoption of new production techniques by means of the process of the formation of physical capital. The intensity and direction of investment activity, then, are essential factors in determining the rhythm of the innovation process, of productivity increases and, by means of interaction with the demand, of the processes of external causation.

With reference to the relationship set up by the proposition (b) above, two distinct cumulative growth mechanisms have been developed by the French school of regulation, specifying the causal relation which runs from productivity to demand. The *first* is based on the identification of the *stimulating role of export dynamics*, given the dynamics of the internal components of demand. The *second* is based on the identification of *internal demand factors* which give rise to cumulative growth and influence the medium-term growth path. In this case attention is focused in particular on distribution mechanisms of the benefits of technical progress to different social classes and on the determinants of investment and internal consumption in the sphere of distribution. In particular, the *external causation mechanism* (Boyer and Petit, 1988) is based on factors which affect the foreign competitiveness of an economic system. Internal growth, in this model, in line with the Kaldorian tradition, is determined by the medium- and long-term dynamic of foreign trade, specifically by export patterns. These patterns are influenced both by external exogenous factors such as the evolution of foreign markets and the price and non-price competitiveness of foreign goods, and by internal and in part endogenous factors such as the terms of trade and thus the competitiveness of national products on foreign markets. The latter are affected, in fact, by patterns in the real exchange rate, by increases in productivity (in so far as they appear in the shape of changes in internal prices rather than in variations in nominal income), and by the results of the process of innovation, which influence the competitiveness (non-price as well as price) of national products. The *internal causation mechanism* (Boyer, 1988) is based on the way in which the benefits deriving from productivity increases are distributed amongst the various social classes. Growth in nominal income and changes in its distribution determine, in fact, different paths of aggregate demand growth and of its distinct components, investment and consumption. Investments depend on both the dynamics of the final demand for goods on the basis of the accelerator principle, and on the profit share on income in relation to trends in wages compared with trends in productivity. Consumption, on the other hand, is specified by adopting a Classical type hypothesis of behaviour: it depends essentially on the overall income of workers and thus on the employment dynamic and real wages, the latter determined on the basis of a competitive market mechanism and/or a distribution mechanism of the benefits of technical progress.

Thus, a specific employment dynamic derives from the joint dynamic of both productivity and production, which depends on contrasting forces: on the one hand, the dynamic of productivity exerts a contracting pressure on employment dynamic, if not a negative one: on the other hand, the productivity itself stimulates economic growth and thus put into action internal and external causal mechanisms, supporting the reabsorption process of labour force driven out from production processes. However, even the demand dynamic is not exempt from contrasting effects as it induces directly a growth in employment volume and at the same time it curbs indirectly this employment growth through its positive effect on productivity dynamic.

**Chart 4: Demand and productivity in the cumulative growth model: the external causation mechanism**

$$\begin{aligned}
 (1.1) \text{EIG}_t &= e_0 + e_1 \text{ISY}_t + e_2 \text{VAIG}_t + e_3 \text{MEG}_t + u_{et}, \\
 (1.2) \text{ISY}_t &= i_0 + i_1 \text{VAIG}_t + i_2 \text{ISYJ}_t + i_3 \text{INNO-INPUT}_t + u_{it}, \\
 (1.3) \text{VAIG}_t &= v_0 + v_1 \text{EXPG}_t + v_2 \text{IDG}_t + u_{vt}, \\
 (1.4) \text{EXPG}_t &= x_0 + x_1 \text{ILPG}_t + x_2 \text{EEXRG}_t + x_3 \text{MEG}_t + x_4 \text{EISYG}_t + x_5 \text{INNO-OUTPUT}_t + u_{xt}, \\
 (1.5) \text{ILPG}_t &= \text{VAIG}_t - \text{EIG}_t
 \end{aligned}$$

Demand and productivity regimes

$$\begin{aligned}
 (1.6) \text{ILPG}_t &= -(e_0 + e_1 i_0) + (1 - e_2 - e_1 i_1) \text{VAIG}_t - (e_1 i_2) \text{ISYJ}_t - (e_1 i_3) \text{INNO-INPUT}_t - (e_3) \text{MEG}_t + u_{1,t}, \\
 (1.7) \text{VAIG}_t &= (v_0 + v_1 x_0) + (v_1 x_1) \text{ILPG}_t + (v_1 x_2) \text{EEXRG}_t + (v_1 x_3) \text{MEG}_t - (v_1 x_4) \text{INNO-OUTPUT}_t + \\
 &\quad + (v_1 x_5) \text{EISYG}_t + (v_2) \text{IDG}_t + u_{II,t},
 \end{aligned}$$

**Chart 5: Demand and productivity in the cumulative growth model: the internal and external causation mechanisms**

$$\begin{aligned}
 (2.1) \text{EIG}_t &= e_0 + e_1 \text{ISY}_t + e_2 \text{VAIG}_t + e_3 \text{MEG}_t + u_{et}, \\
 (2.2) \text{ISY}_t &= i_0 + i_1 \text{VAIG}_t + i_2 \text{ISYJ}_t + i_3 \text{INNO-INPUT}_t + u_{it}, \\
 (2.3) \text{VAIG}_t &= v_0 + v_1 \text{EXPG}_t + v_2 \text{PCG}_t + v_3 \text{PFIG}_t + v_4 \text{GCG}_t + u_{vt}, \\
 (2.4) \text{EXPG}_t &= x_0 + x_1 \text{ILPG}_t + x_2 \text{EEXRG}_t + x_3 \text{MEG}_t + x_4 \text{EISYG}_t + x_5 \text{INNO-OUTPUT}_t + u_{xt}, \\
 (2.5) \text{PCG}_t &= c_0 + c_1 \text{WBG}_t + c_2 \text{OSG}_t + u_{ct}, \\
 (2.6) \text{PFIG}_t &= s_0 + s_1 \text{OSG}_t + s_2 \text{VAIG}_t + s_3 \text{RLIR}_t + s_4 \text{ICUG}_t + u_{st}, \\
 (2.7) \text{RWG}_t &= w_0 + w_1 \text{ILPG}_t + w_2 \text{UR}_t + u_{wt}, \\
 (2.8) \text{OSG}_t &= p_0 + p_1 \text{ILPG}_t + p_2 \text{VAIG}_t + u_{pt}, \\
 (2.9) \text{WBG}_t &= \text{RWG}_t + \text{EIG}_t, \\
 (2.10) \text{ILPG}_t &= \text{VAIG}_t - \text{EIG}_t,
 \end{aligned}$$

Demand and productivity regimes

$$\begin{aligned}
 (2.11) \text{ILPG}_t &= -(e_0 + e_1 i_0) + (1 - e_2 - e_1 i_1) \text{VAIG}_t - (e_1 i_2) \text{ISYJ}_t - (e_1 i_3) \text{INNO-INPUT}_t - (e_3) \text{MEG}_t + u_{1,t}, \\
 (2.12) \text{VAIG}_t &= (v_0 + v_1 x_0 + v_2 c_0 + v_2 c_1 w_0 + v_2 c_2 p_0 + v_3 s_0 + v_3 s_1 p_0) / D + \\
 &\quad + [(v_1 x_1 + v_2 c_1 w_1 - v_2 c_1 + v_2 c_2 p_1 + v_3 s_1 p_1) / D] \text{ILPG}_t + [(v_1 x_2) / D] \text{EEXRG}_t + \\
 &\quad + [(v_1 x_3) / D] \text{MEG}_t + [(v_1 x_4) / D] \text{INNO-OUTPUT}_t + [(v_1 x_5) / D] \text{EISYG}_t + \\
 &\quad + [(v_4) / D] \text{GCG}_t + [(v_2 c_1 w_2) / D] \text{UR}_t + [(v_3 s_3) / D] \text{RLIR}_t + [(v_3 s_4) / D] \text{ICUG}_t + u_{II,t},
 \end{aligned}$$

with  $D = (1 - v_2 c_1 - v_2 c_2 p_2 - v_3 s_1 p_2 - v_3 s_2)$ .

**Chart 6: Employment multiplier accounting**

The point of departure of our exercise is the “Keynesian” expression equalising values of aggregate demand and supply, which should be read as an accounting identity among flows:

$$(1) \quad p \pi N = c_w w N + c_{NL} Y_{NL} + A.$$

On the l.h.s. of (1) there is the value of aggregate supply, with  $\pi$  for the average product of labour,  $N$  the volume of employment and  $p$  the price level of output. On the r.h.s., three components are distinguished out of an aggregate demand in nominal terms: a) a consumption demand “induced” out of labour income - with  $w$  the nominal wage per worker and  $c_w$  the propensity to consume of workers -; b) consumption out of non-labour income  $Y_{NL}$  with propensity  $c_{NL}$ ; c) an “autonomous” component of demand  $A$  aggregating here investment, government consumption and net exports<sup>37</sup>.

The key step, within an “employment multiplier approach”, is the explication of the employment  $N$  from the accounting demand-supply identity (1):

$$(2) \quad N = 1/\pi \left( \frac{1}{1 - c_w(w/p)/\pi} \right) \left( \frac{c_{NL} Y_{NL}}{p} + A/p \right).$$

The “warranted” level of employment, within the reference period, thus comes out to be the product of three factors: a) the reciprocal of the average productivity,  $1/\pi$ , i.e. the labour coefficient of the national product, reflecting labour saving technological change; b) the expression of an induced demand from income out of employment (the “multiplier”), determined, for a given propensity  $c_w$ , by the parameters of a primary distribution of the output (the share of labour  $(w/p)/\pi$  on total income); c) the volume, in real terms, of exogenous demand, including here the “autonomous component”  $A$  and consumption out of a non-labour income with propensity  $c_{NL}$ . Exogenous demand appears on the right, as the prime factor of propulsion of economic activity and employment, in Keynesian fashion.

The former expression may be, through logarithmic differences or calculation of rates of variations over intervals of time, the point of departure for exercises of decomposition for the variations of employment, among the contribution of these three factors. Our empirical exercise will therefore derive variations of  $N$  as additive result of three component dynamics: a) labour coefficient (i.e. inverse productivity); b) the “multiplier”; c) the autonomous demand in real terms, augmented by the volume of consumption out of non-labour income, indicated here as  $AAC/p$ .

$$(3) \quad N_t = (1/p)_t + \left( \frac{1}{1 - c_w(w/p)/p} \right)_t + (AAC/p)_t,$$

where with the italics we refer to rates of variations over the time interval  $t$ .

In a practical application of (3), the only additional difficulty arises from the unavailability of separate figures for the two consumption propensities  $c_w$  and  $c_{NL}$ , while all the other variables are easily available in the current National Accounts statistics. In our application, therefore, we were obliged to substitute the specific propensities with a single common value: an aggregate consumption/income ratio  $c_y$ . When  $c_w$  and  $c_{NL}$  values differ, such an approximation implies the introduction of a distortion in the accounting identity between l.h.s and r.h.s of the expressions (1) to (3). Employment variations calculated as the sum of the components, on the one hand, and the effective variation rate of  $N$ , on the other, may now differ because of this procedure, and residual differences may emerge.

In the empirical exercise, in fact, (3) was substituted by:

$$(3 \text{ bis}) \quad N_t @ (1/p)_t + \left( \frac{1}{1 - c_y(w/p)/p} \right)_t + (AAC'/p)_t,$$

where  $AAC' = c_y Y_{NL} + A$ .

Growth of demand, income distribution and labour saving technical progress (technological deepening) appear, thus, to be the background factors in employment variations. The scheme is capable of explicating two effects of trends in functional distribution on demand, and consequently, on employment variations: a) at the level of a “primary” distribution of the value added, “real wages” increasing in excess (or in default) of labour productivity will increase (decrease) the multiplier, for a given value of  $c_y$ ; b) effects of redistribution adverse to labour income may, in principle, be counterbalanced, on the demand side, by increases of consumption out of non-labour income, entering the value of  $AAC'$ .

Looking at the above expressions, it is evident that the multiplier will remain constant, with no autonomous contribution to employment dynamics, in the case in which:

$$(4) \quad c_y + w/p - p = 0$$

If (4) holds (i.e. real wages increase in line with productivity, and distribution - and redistribution - does not alter the aggregate propensity to consume), variations of employment in an interval of time will exclusively depend upon the differential between the dynamics of autonomous components of demand, augmented by the consumption out of non-labour income, on the one hand, and the dynamics of output per-capita, on the other:

$$(5) \quad N_t \lesseqgtr 0, \text{ se } (AAC'/p)_t \lesseqgtr p_t, \quad \text{con } c_y = 0, \quad \text{e} \quad w/p_t = p_t.$$

In the case of an increase of real wages lower than the productivity one ( $p > w/p$ ), a compensating increase of exogenous demand (including consumption out of non-labour income) higher than the productivity one ( $AAC'/p > p$ ) is required to keep a

<sup>37</sup> Labour income includes a component attributed to self-employed, assuming the same average compensation  $w$  of the employees’ one. Adopting an extreme hypothesis, “à la Kalecki”, consumption would derive only from workers, with  $c_w = 1$  and  $c_{NL} = 0$ , so that the previous relation would reduce to the identity between the value of production and the sum of “wages” and “profits” which will coincide correspondingly with consumption and other components of demand.

constant level of employment; while in the opposite case ( $p < w/p$ ), a necessary but not sufficient condition for  $N = 0$  will be  $AAC'/p < p$ .

#### Chart 7: Decomposition of employment dynamics in Europe

The employment decline in the years 1991-1995 in Sweden seems the largest of all the countries considered. Three phenomena appear at the basis of this deep downturn with respect to the positive experience of the previous three decades: a) a pronounced decline in the autonomous components of demand (with a growth rate of +0.96% against +2.64% for the eighties); b) a recovery for productivity dynamics (+2.3% in the early nineties, +1.37% in the eighties); c) a low dynamic for induced demand, given the further decrease in the labour share on national income (the distributional gap<sup>38</sup> has been -2.26 percentage points in the early nineties, against -1.11% for the eighties, per annum). These figures show the impact of radical changes in the mechanisms of income and fiscal policies as consolidated in the previous decades.

In the United Kingdom, the macroeconomic scenario changes in a significant way in the early nineties with respect to the previous decade, and the employment dynamic becomes negative in the period 1991-1995 (-0.93% per annum), because of the economic downturn of the early nineties. This dynamic can be mainly attributed to two factors: a) a slight rise in the growth rate of productivity (from +1.95% in the eighties to 2.28% in the early nineties); b) the negative contribution of the multiplier which decreases by -1.38% per annum, while in the previous decade it positively affects employment dynamics. The change in the value of the multiplier is due to a distributional gap strongly adverse to labour: real compensations rise at the rate of +0.79% determining a gap with respect to productivity growth of 1.49 percentage points per annum. At the same time, the aggregate consumption/income ratio was almost constant. The autonomous components of demand tend to compensate for the previous two factors, growing at the rate of +2.48% (against 1.55% in the previous decade, per annum). In decomposing this dynamic, a strong positive impact of the consumption out of non-labour income emerges (+1.7%). This result confirms the role played by distributional changes, with a compensation of private consumption out of non-labour income for the decline in induced demand derived from labour income: nevertheless this compensation appears insufficient to determine employment gains, given the negative role played by the variation of the multiplier.

In Italy, for the nineties there is evidence of a serious worsening for employment performance (-1.01% per annum). This decline seems associated with two factors: a) a recovery in the labour productivity dynamic (+2.17% in the period 1991-1995, against 1.7% in the eighties, per annum); and b) a downturn in the contribution of the multiplier which becomes negative (-1.46%). This last factor is explained by an almost stationary dynamic for real compensations (-0.27%), which brings about a pronounced decline of the labour share in national income. In the Italian case, this distributional change - which determines a weak dynamic for private consumption out of labour income -, might have contributed to the poor employment performance in the years 1991-1995. In fact, there has been in this period a recovery of the autonomous components of demand (+2.86% against +2.08% in the previous decade, per annum), triggered by the contribution of net exports (+1.76%). But, notwithstanding the exogenous components push, the stagnation of labour income might have affected the induced demand so strongly as to determine a growth rate of aggregate demand insufficient to compensate for the labour saving effects of productivity growth<sup>39</sup>.

With reference to France, it should be noticed that - in a broader temporal perspective (1960-1995) - while in the first two decades the employment performance appears favourable as a result of the positive gap between the dynamic of autonomous components of demand and the one of productivity (in the sixties) or as a result of the role played by the multiplier (in the seventies), in the subsequent fifteen years the multiplier always provides a negative contribution to employment dynamics. In the eighties, in fact, the positive gap (+0.8 percentage points per annum) between autonomous demand growth and productivity growth (given the considerable influence of private consumption out of non-labour income) has been entirely compensated by the change in the multiplier (-1% per annum). Also in the more recent period (1991-1995), although the gap between autonomous demand growth and productivity remains positive (+0.3%), there is evidence of slight employment losses, as a result of the negative contribution of the multiplier (-0.11%) and given the "residual" (-0.30%). The pattern of labour share in national income confirms the negative trend started in the previous decade, with a -0.49 percentage points gap between real compensations and productivity growth.

Finally, in West Germany in the early nineties, a near constancy of the employment dynamic is associated with both an identical trend for autonomous components of demand and productivity, and a steady level of the multiplier. In this period, although there is evidence of a distributional change towards non-labour income (the distributional gap is -1 percentage point per annum), the rise in the aggregate consumption/income ratio compensates this variation. If we consider the whole cycle starting in 1990 up to 1995<sup>40</sup>, the employment dynamic is slightly positive, given a growth rate of autonomous demand higher than productivity gains. For this period, there is evidence of an important role played by the net-exports dynamic, which contributes to autonomous demand growth (+0.94%), but a relevant role is also played by consumption out of non-labour income, while government exports and private investment show a decreasing positive influence. In particular, private investment, after the great push in the sixties and a good performance in the subsequent two decades, presents a severe stagnation in the early nineties, with a negative contribution to autonomous demand growth. The decade 1981-1990 is, instead, the period with the best employment performance for West Germany (+0.54% per annum). This pattern seems entirely determined by the gap of the autonomous component over productivity growth, while the contribution of the multiplier appears negative, given both the distributional changes adverse to labour income (the distributional gap is about -0.6 percentage points) and the small decline in the aggregate consumption/income ratio.

<sup>38</sup> I.e., the difference between real compensation growth and labour productivity growth.

<sup>39</sup> On the recent distributive dynamics in Italy, see Banca d'Italia (1995, 1996) and Istat (1996) for details.

<sup>40</sup> 1990 is, in fact, the initial peak for last cycle for West Germany.

## **Appendix**



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