Innovation and investments in an urban cross-sectoral growth model: a change of course is needed in macroeconomic policies

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1. Introduction

The case of an urban economy (Markusen 2007, Cappellin 2007, Markusen and Schrock 2009, Cappellin 2011) may be relevant in the design of the macro-economic policies aiming to a higher employment in the Euro area, since national States have increasingly less power on the traditional tools of macroeconomic policies. In urban areas, monetary policy is not relevant since the monetary market has a national or international dimension and the interest rate is exogenously determined. Public expenditure is to a large extent rigid since the local authorities are obliged by law to a balanced budget. The market price of goods and the wages are to a large extent exogenous, due to the high interregional mobility of goods and labor. Also export and import can't be promoted through exchange rates adjustments and the urban economies are mainly specialized in services which have a mainly local market. Therefore, the crucial instruments for local authorities in order to promote growth are the policies for innovation, investment and private finance.

Due to the fall of investment in the Euro (12) area €369 billion were lacking in 2013, in order to return to the investment level in 2008. That value almost coincides with the value of €300 billion indicated by the new President of the European Commission, Jean-Claude Juncker, in his proposal in order to relaunch the European Economy.

As indicated in table 1 in the appendix, investments in the Euro (12) area have fallen by 19,8% since the beginning of the crisis and their share on the GDP has decreased by 3,9 percentage points in favor of the other components of the final demand. That decrease has been much greater than that of private consumption (-1,7%) and it is the main factor of the decrease of the GDP (-2,1%). On the contrary, notwithstanding the public debate in Europe focuses always on the State budgets, public consumption have increased (2,7%) on the average in the Euro area in the period 2008-13.

Therefore, the decrease of investments has been the most important factor of the decrease of the GDP in the Euro area, since it would have determined a decrease by 4,3% of the GDP, if this negative effect would have not been compensated by the increase of the net exports and by the public consumptions.

Moreover, fixed investment are mostly accompanied by immaterial investment into new knowledge, in the design of product and process innovation and also by an increase of employment, since firms have to invest both in capital expenditure and in new jobs in order to create new productions.

A sectoral breakdown of investments is not available for the Euro area, but only for some countries. As indicated by table 3, in Italy the decline of investments has been greater in rather

traditional sectors, such as the public utilities sectors (electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities), in the construction sector and in the manufacturing industry, while it has been lower in more innovative sectors such as, information and communication services or arts, entertainment and recreation and other service activities, where the demand is more dynamic. Moreover, the decrease of the internal demand determined by lower investment has had a strong negative effect in specific sectors, such construction industry, machinery industry and also business services. Finally, as indicated in table 4 in the appendix in the case of Italy, the low flow of net investments in the period after 2008 have determined a decrease of the stock of fixed assets in the agriculture, electricity, gas, and manufacturing sectors, thus determining a process of "disinvestment" or deindustrialization.

The traditional macroeconomic policies have not been capable to promote a recovery of the European economy after six years of recession and stagnation (Cappellin , Marelli, Rullani and Sterlacchini 2014; Marelli 2014). Therefore, there is the need of a new course of action and the case of an urban economy indicates the need to use also at the national and EU level the approach of industrial and regional policies.

On the other hand the theories and models of regional economics have only focused on the case of the individual regions and urban areas (Capello 2007), given national growth as exogenous. Similarly, also industrial economics has usually focused on the case of the individual sectors and companies. Therefore it seems useful an attempt to define the implications of these theories for promoting GDP growth and employment at the national and European level.

Technological change, the creation of new productions and the improvement in the sectoral structure of the economy are key factors, which determine national growth (Lundvall and Johnson 1994, Fagerberg 2005). At the firm level and in a regional and urban framework, employment may be promoted through the creation of new productions and innovation (Cappellin and Wink 2009, Cappellin 2010). The traditional macroeconomic model does not consider these factors and it can't be used in the evaluation of the impact of industrial and regional policies.

In particular, the crucial factor on which the economic policies should act is the innovation. Innovation should not be understood as a specific ICT application or a new technological start up. Innovation is also different from technological change, which is often exogenous, while innovation is the result of an intentional and expensive activity of internal R&D or of informal interactive learning with many other firms and actors. In a broader perspective, innovation is represented also by changes in the needs and behavior of the users and of the demand of goods and services, by the discovery by the firms of new technological solutions, by the improvement of the goods and services already produced, by the production of new goods and services and finally, also, by the design of new instruments of public governance, which facilitate the users to interact between themselves, to the producers to interact between themselves and with the users. In particular, the task of the industrial and regional policies is to manage these complex relationships between the producers and the users and to insure the continuous and interdependent changes in the demand and in the supply.

This paper aims to illustrate a theoretical model, where growth is based on the interdependent evolution of the aggregate demand and the aggregate supply. A crucial role is attributed to the flows of new knowledge, innovation and investment, as factors not only of the "potential growth" but also of the current level of employment and GDP. Therefore, the economic policies

should act not only on the level of the aggregate demand and supply but also on their sectoral and regional structure.

The paper first illustrates the role of new knowledge in determining the level of investment and the aggregate demand. Then, it defines the characteristics of the aggregate demand and of the aggregate supply taking into account the sectoral structure of the economy and the characteristics of their equilibrium. Finally, it analyses the changes in the level of employment and GDP determined by technological change and various types of macroeconomic and industrial and regional policies.

2. Innovation as the key factor of investment and GDP growth

The fall of the capital expenditure by the companies, the households and the governments is the main factor, which has determined the recession in Europe. Therefore, policies should identify the factors which have led to this fall of investments and those which may help in promoting investments.

In particular, the economic theory of investment indicates that the internal rate of return of investment (IRR) projects should be greater than the interest rates adjusted for the level of risk and it depends on the flow of the revenues (R) and of the costs (C).

$$\sum_0^n (R_t (K_t, Z_t) - C_t (K_t, Z_t)) / (1 - IRR)^t = 0$$

Knowledge (K) and product innovations, together with other variables (Z), affect the revenues of the investment projects. Knowledge (K) and process innovations, together with other variables (Z), affect the costs of the investment projects. The length of the time horizon (t) is determined by technological and market factors and also by organizational and institutional capabilities and constraints and it is crucial in determining the financial viability of investment, since it determines the relative importance of the costs, which mainly accrue in the short term, and the revenues, which accumulate in a longer horizon.

The synthetic logic of the financial formula conceals the solid factors that lead to innovation within a firm and stimulate investment decisions. New productions require both innovation and investments. First of all, innovations stimulate investments by increasing the profitability of the new investment projects. On the other hand, it is not possible to elaborate innovative investment projects without a prolonged investment in R&D and technical design and a coherent effort in trying to anticipate wide and continuous changes in the consumer behavior, often lasting several years. Then, later, innovations in the productions can't be introduced without an even larger capital expenditure, especially in the case of the high tech sectors. Therefore, initial investments to support creativity in the design phase are a preliminary step in order to introduce major innovation in the production phase. Too low investments in R&D, technical design and market analysis do not allow precisely defining complex investment projects, and that will determine a longer period of completion of the investment project. Thus, the lack of innovative and high return investment projects discourage firms to increase the capital expenditure, as it is currently occurring in Europe.

Industrial and regional policies should improve the internal capabilities of the firms but also facilitate those creative processes which are based on the interaction between different actors and on the original combination of complementary pieces of knowledge which belong to different actors. In fact, innovation is not only determined by factors internal to the large and

small firms, while it is the result of a process of learning by interacting (Lundvall and.....) by the firms with the various clients and suppliers firms, the universities and research centers, various public institutions, the banks and other financial organizations and the specialized consulting services.

The governance of large, complex and long term investment and innovation projects requires the creation of new specialized intermediary organizations and infrastructures for the governance of the innovation networks (Cappellin and Wink 2009). The missing recovery of capital expenditure by the European firms is also the effect of the lack of an effective innovation and industrial policy in Europe, since the design of large innovation projects requires the preliminary public and private investments in building or strengthening open and flexible innovation networks.

In particular, product innovations require a favorable and stable macroeconomic framework, which increases the confidence by the firms, and also advanced capabilities and courageous strategic decisions within the individual firms, but they require also a change in the behavior of the users. New needs are expressed by the most innovative users (Von Hippel 1994) and are tightly related to the increasing knowledge and education level of population, such as the needs for a better quality of life, environment, culture, communication and mobility. That implies a new demand for specific innovative goods and services and stimulates the firms and the institutions to create new production capacity in new sectors. The demand by specific innovative users often anticipates the new productions introduced by the innovative firms or by the government.

Some goods and services have a collective and not a private nature. Therefore, as in the case of "public goods" or of "common goods", the government policies are needed in order to aggregate the individual demands. Important areas where investments can be stimulated by appropriate industrial and regional policies are the sectors, which have an high capital intensity, such as construction and public utilities. Other strategic sectors are the sectors where the demand in the long term is dynamic and where is most important to promote the creation of modern productions, such as transport, culture, health, tourism. As all these sectors are mainly concentrated in urban areas (Cappellin 1988), it is important that a European economic policy (European Commission 2008) aiming at promoting investments focuses on the innovations to be adopted in the urban areas (Ciciotti 2014).

In a stagnation situation or in a liquidity trap, such as the one which is occurring now in Europe, investments are not sensible to lower interest rates in the capital markets and can only be increased by major changes in the demand of productions due to technological breakthroughs or by the intelligent anticipation of the current changes in the consumer behaviors. Moreover, a high positive rate of return of the investment projects is only a necessary condition and the decision by a firm to invest depend also on strategy, such as technological ambitions, or cultural values, such as the sense of belonging to the local community, or also the capabilities of the entrepreneurs.

However, European firms are almost obliged to increase their investment in innovation in order to survive in very competitive markets, where the foreign firms can increase their technological advantage. In fact, according to a Schumpeterian perspective the large majority of entrepreneurs are risk averse and do not invest in innovative productions since they do not have innovative ideas and innovator almost by definition are a minority. However, if few capable and not risk averse entrepreneurs have innovative ideas, which allow a high positive rate of return, that will lead the other more traditional entrepreneurs to invest following their

example. Moreover, the increase of the investments determines an increase of the aggregate demand, and that facilitates the realization of the optimistic expectation of the first innovators.

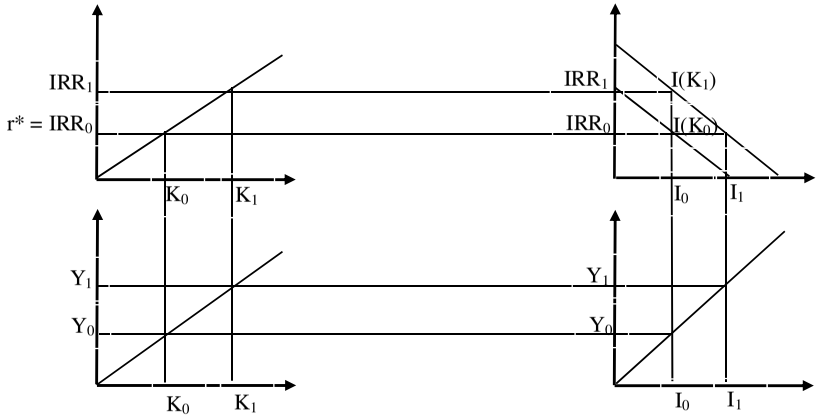

Figure 1: Knowledge and innovation promote investment and GDP growth

Therefore, new knowledge and innovation affect both the demand by the users and the supply by the firms and increase the internal rate of return of investment as indicated in figure 1. A greater knowledge increases the number of projects which have an internal rate of return greater than the rate of interest (r* adjusted for the degree of risk). That determines a shift upward of the Keynesian investment schedule. Finally, the increase of investment leads to greater aggregate demand and to an increase of the GDP (Y).

3. The negative slope of the aggregate demand and the sectoral structure of the economy

The evaluation of the macroeconomic impact of industrial policies requires a model, which does consider the sectoral structure of the economy, since industrial policies imply a sectoral breakdown and naturally have a selective nature. At the same time this model should allow to evaluate the impact of investments on the aggregate GDP, as in the traditional macroeconomic model.

In fact, the aggregate demand schedule in the traditional macroeconomic model does not indicate the demand of the individual sectors of the economy, although the aggregate production is the summation of the production of the various sectors and the aggregate price is an average of the individual prices.

In the aggregate economy there are an almost infinite number of goods and services and each of these have a different and specific price. The price is higher the higher is intrinsic quality of the good and service considered or the value that the user is willing to pay. The price is also related to the technological level of the sector considered, as high tech products have higher prices than the medium tech and the low tech products.

In particular, in a cross sectoral perspective, the aggregate demand may be represented as the relationship between the sequence of the prices of the various sectors (or the implicit deflator), considered according to a decreasing level, and the total level of the production (or the real value added), which may be obtained by sequentially adding the production of the various goods and services, starting from the sectors having the higher price. This procedure of construction of the cross-sectoral aggregate demand schedule insures the comparability of the schedules of the demand with that of the supply, as it will be illustrated below.

The cross-sectoral aggregate demand schedule in this model is similar to the microeconomic demand schedule of an individual product, in the case of "perfect price discrimination", which represents the case when each producer is capable to sell its respective good and service at a different price than that of the other similar products and services, due to the different characteristics of each good and service and the different willingness to pay by the respective users. For example, higher quality goods or services (i.e. a concert of classical music or an iPhone 6) or high tech sectors require higher prices (p_d) than traditional or lower quality products (a concert of pop music or an iPhone 4) or low tech sectors.

In this model, as in the traditional microeconomic demand model, the demand depends on the relative price and quality of a good or services with respect to the substitute goods. In particular, the demand schedule depends on two factors: a) the prices which the users are willing to pay, b) the relative quality of the considered productions with respect to the productions with an higher or a lower quality. In particular, the price of the goods and services the consumer is willing to pay is determined by the individual characteristics of the users (i.e. income, free time, knowledge) and also by the quality characteristics of the good and service considered. On the other hand, the quality characteristics of the good and service depend on the product innovation adopted by the firms producing the good or service considered and on the skills of the firms and their workers.

This cross-sectoral model of the aggregate demand indicates a negative relationship between the GDP and the price level, similar to the aggregated demand in the traditional macroeconomic model. However, the theoretical base is different, since in the traditional model the negative slope is due to the effect of lower prices on an increase of the real money supply and on lower interest rate and greater investment and GDP. On the other hand, the cross-sectoral aggregate demand schedule of this model, as the traditional macroeconomic demand schedule, may shift to right in the case of an increase of the various elements of the aggregate demand, such consumption, investment, public expenditure and the net exports, determined by monetary or fiscal expansionary policies.

4. The sectoral structure of economy and the cross-sectoral supply schedule

The supply side of the economy is given by the level of production and of employment of the various sectors. In particular, the various sectors (such as: high tech, medium tech and low tech sectors) have different technological level and labor productivity. In figure 2 the various sectors are ordered according to a decreasing level of average labor productivity and the value of the production of each sector is given by the product between the productivity and the employment or by the surface of the each column.

In particular, table 2 in the appendix indicates the level of productivity of 16 sectors in a decreasing order and also the employment level of these sectors and the growth rate of product, productivity and employment in the 2008-2013 period in the Euro (12) area. It is important to

clarify that the level of productivity of the individual sector does not depend only on its technological characteristics, but also on the capital intensity of that sector, such as in the case of the no-manufacturing network industries ("public utilities").

The table 2 indicates that in the traditional sectors, such as manufacturing, construction and trade, the increase of the product is the result of the increase of productivity and of employment. As in these sectors there is normally excess productive capacity, investment apparently are not needed in order to increase output and employment. However, even in these rather traditional sectors, investments are useful in order to increase productivity and the competitiveness of the companies, even when that may imply a decrease of employment, which may be compensated by a shift of employment toward new more modern sectors. On the other hand, in the more modern sectors, such as the financial, information services and the network no-manufacturing industries and cultural services, there is the need of an investment both in fixed assets and in qualified human resources, in order to increase the production capacity and the productivity.

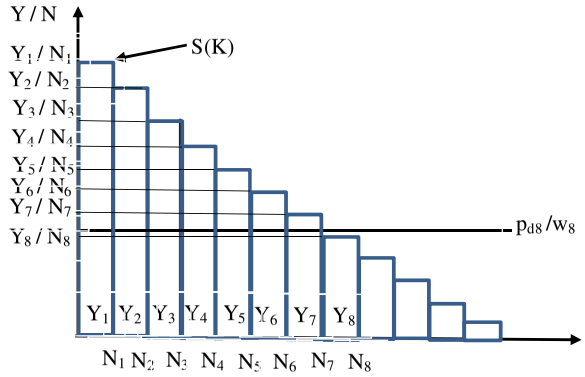

Figure 2 : The cross-sectoral supply side of the economy and the employment and GDP levels

Therefore, the total supply of the economy may be represented as a decreasing schedule, which is constructed by adding the actual employment level in each sector to the total employment level of the other sectors starting with the sectors which have an higher labor productivity. From construction, the total GDP of the economy is measured by the surface of the area below the supply schedule.

However, not all sectors may actually have a positive production level, since that depends on the condition that the production costs are lower than the market price which the users are willing to pay and which is indicated by the cross-sectoral aggregate demand, described above. For example, some sectors, such as sector 8 in figure 2, may not be economically viable, since they are characterized by a too low productivity (Y_i/N_i) or have a unit cost (p_{is}) which is higher than the market price (p_{id}):

1) $p_{di} < p_{si} = w_i N_i/Y_i$ or $Y_i/N_i < w_i/ p_{di}$

where w_i represents the unit labor cost and N_i the employment and Y_i the production of the sector i.

The production and also the employment level of each sector may vary up to a maximum level, which we may suppose depends in a long term perspective on the total production capacity of the sector considered or on the capital stock, which is the result of the previous investments and the rate of technological obsolescence. Thus, the actual level of production and employment of each sector, in a short term perspective, has an intermediate value, which depends on the level of the actual demand for the considered sector, given its market price.

Looking to the aggregate economy, the maximum level of production, which is actually indicated by the supply side of an economy, is usually lower than that of the full employment for two reasons. First of all, the actual production and employment level of each sector may be lower than the level which corresponds to the full utilization of the capital stock, which has been determined by the investments in the previous periods.

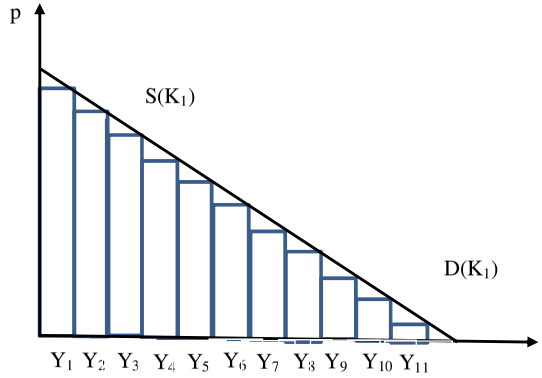

Figure 3 : The balance between the supply and demand of the various sectors in the economy

Secondly and most important, the supply schedule in a given period may be too low since it does not consider some new sectors which may be created in the future in order to increase the total employment, if the appropriate conditions on the demand and the supply realize, as it will be indicated below.

The cross-sectoral model of the aggregate supply of figure 2, which indicates a relationship between the productivity level and the employment level of the various sectors, may be easily transformed into a new model, which indicates a relationship between the price level and the production level. This model, which is indicated in figure 3, has the advantage to be compatible with the above illustrated aggregate demand schedule.

By construction, the product level of each sector measured at constant prices, indicated on the horizontal axis of figure 3, corresponds to the product of the employment level and the productivity level in the figure 2 for the same sector or to the surface of the corresponding column. On the other hand, the surface of the area below the demand schedule in figure 3 indicates the product level measured at current prices for each sector and for the overall economy.

In fact, given the values of the productivity (Y_i/N_i) and the unit labor cost (w_i) in each sector and the interest rate (r) and the cost of capital which is required by each job place ($K/N=\beta_i$), it is possible to calculate the unit production cost (p_{si}):

1) $p_{si} = s_i N_i /Y_i + r K_i /Y_i =$
$(s_i N_i + r \beta_i N_i) /Y_i =$
$w_i N_i/Y_i$

Where (w_i) may be defined as the total unit labor cost, which includes the cost of labor and the per capita cost of capital. The total unit labor cost increases with the level productivity of the individual sectors and in the case of two sectors 1 and 2, we may have:

2) if $Y_1/N_1 > Y_2/N_2$ then $w_1 > w_2$

In fact, the more advanced sectors have to use more skilled labor resources, having an higher wage (s_i), and they also need a greater capital per capita (β_i), since they use more modern techniques.

We may also suppose that the price that the users are willing to pay for the various products and services considered is related to their respective quality and that this latter is related to the labor productivity level (Y_i/N_i) of the respective sectors, since the sectors which are more technological advanced can produce goods and services, which have an higher quality and an higher price. Thus:

1) if $Y_1/N_1 > Y_2/N_2$ then $p_1 > p_2$

From the expressions indicated above it is possible to derive that:
$w1/w2 > p1/p2$

which indicates that the total unit labor cost in the more productive sectors increases more than the price of the respective production. That implies that the supply schedule increases more than the demand schedule and may eventually become higher than the demand schedule.

The figure 3 indicates the specific case when the demand and the supply of each sector are exactly equal. That implies that the market price (p_{di}) is equal to the unitary cost of production (p_{si}). In fact, as indicated above also in figure 2, the productions which are economically efficient should satisfy the condition:
$p_{di} \geq p_{si} = w_i N_i/Y_i$

Finally, we may suppose that the demand schedule increases due to an increase of the aggregate investment by the firms. In this case, which is indicated in figure 4, the new and greater aggregate demand will be distributed between the various sectors according to the quality characteristics of their productions and according to the specific pattern of preferences of the users. Therefore, that may determine either an increase of the quantity produced by the previously existing sectors or also the creation of a new demand for some new productions.

An increase of the aggregate demand may allow the production of the new goods and services (X_i), additional with respect to the previous productions (Y_i) (Marshall 1920, Pasinetti 1981 and 1993). To be efficient, the new productions should have a production cost lower than the market prices that the users are willing to pay, as indicated by the demand schedule, and the firms should have previously increased their production capacity through appropriate investments.

Figure 4 indicates the shift of the supply schedule to the right determined by the creation of new sectors. X_1 indicates a high tech good which has a very high production cost. After the increase of the demand, the cost becomes lower than the market price and the good can be bought by the users. Moreover, X_2 and X_3 indicate two new medium tech goods or services, which can be produced after the increase of the demand, since they are preferred by the users to some of the other existing productions, being more qualified than these latter.

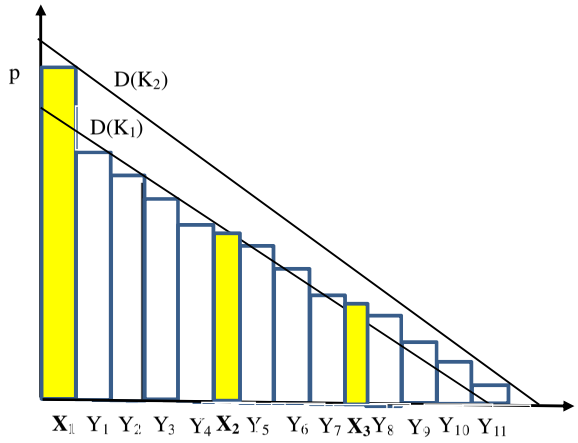

Figure 4 : The creation of new sectors determined by an increase of aggregate demand

Therefore, in this case, the *ex ante* decision by the firms to invest for expanding the capacity in these new specific sectors has proved to be correct, since not only the investments have increased the aggregate demand, but also they have led to an increase of the production capacity of the same firms, which *ex post* corresponds to the level of the demand for the new productions considered, due to a specific change in the patterns of the user preferences.

In conclusion, investments increase the production capacity of new sectors and determine a shift of the supply schedule to the right. The increase of investment increases the aggregate demand. Finally, the increase of the demand in the specific sector considered allows the overcoming of the barriers to entry and the creation of new productions.

5. The balance between the demand and the supply in the general case

The previous figures have considered a limited number of sectors, similar to those considered in the national accounting statistics, such as those indicated in table 2 of the appendix. When the number of sectors or of productions become very high, then the shape of the supply schedule becomes continuous and it may also indicate an irregular form, as indicated in figure 5. Then, the demand (Y_d) and the supply (Y_s) schedules may intersect in various points.

The areas A, B an B' have a particular significance. In order that production is feasible it is required that the demand schedule is greater than the supply schedule, as in the intervals: Y_1 - Y_2 and Y_3 – Y_4, where the prices which the users are willing to pay are greater than the costs of

the producers. If the various goods are different one from the other and the producer can discriminate the users, they can ask the highest price that the users can pay. Thus there is a rent, indicated by the area A, determined by the difference between the market price and the production cost for each sector.
On the other hand, when the supply schedule is higher than the demand schedule, as in the interval $Y_2 – Y_3$ the costs of the producers are higher than the price that the users are paying and production is not economically efficient. However, we may suppose that the users are willing to consume more of the lower quality goods and substitute them to the more qualified and too expensive goods. That implies that the interval $Y_2 – Y_3$ indicates an additional production of that good or service, which has a price (p_3), as indicated by the intersection between the demand and the supply schedule.

Moreover, if the users are willing to pay the price indicated by the demand schedule, while the producer can produce the additional production at a cost indicated by the new point of intersection between the two curves (p_3), then the area B' indicates the rent of the producers of the less qualified goods and services that the users are willing to buy in alternative for the higher quality goods, which can't be economically produced, as indicated in the area B.

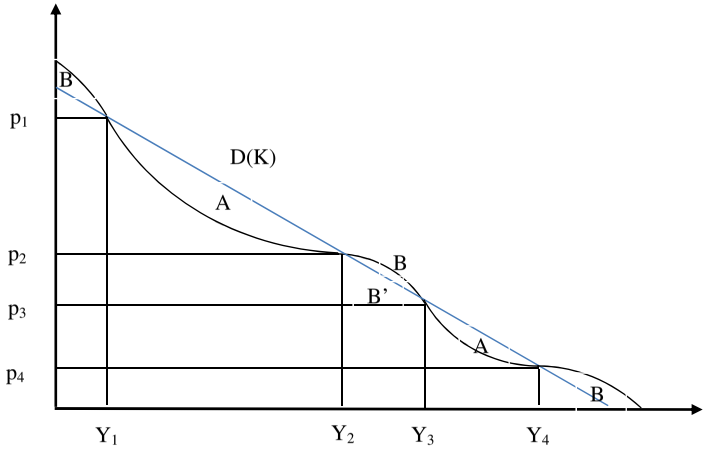

Figure 5: The cross-sectoral demand and supply schedules in the general case

The two extreme areas B (before Y_1 and after Y_4) indicate the cases of goods and services, which can't be produced, unless there is a shift of the demand or of the supply schedule. In fact, the continuous increase of the wages costs and the capital costs for the most technologically advanced productions, where productivity is very high, may lead to the situation when the costs are higher than the market price, notwithstanding the increase of the prices that the users are willing to pay for these more qualified products or services. Similarly, in the case of the least qualified productions, when the quality and the productivity of the goods and services decrease, the decrease of the costs may be lower than the decrease of the price, that the users are willing to pay, due to a too low decrease of the wages and of the capital required. Also in these two cases the production can become possible after appropriate changes of the demand or of the supply schedules.

Clearly, the demand and the supply schedules in figure 5 define a level of total production (Y_4) which is lower than the level which correspond to a full employment situation. Otherwise the salaries (s) would increase and that would lead to an upward shift of the supply schedule and to a lower production and demand of labor. Thus, appropriate policies may change the level and/or the form of the demand or supply schedule in order to increase the production and the employment level.

Another characteristic of this model is that the value of the total revenues by the producers is indicated by the surface of the area below the demand schedule. These revenues are distributed to the different production factors of the various sectors and correspond to the incomes of the workers ($s_i N_i$) and of the owners of the capital ($r K_i$) and to the profits or rents to the firms. Therefore, the value of the total demand is equal to the value of the total supply and the model indicates that the demand determines the supply, but also the supply determines the demand.

In particular, in order to increase the level of employment and of GDP, appropriate policies should increase the employment and production in the existing sectors and/or promote the creation of new sectors. That requires a change in the cost structure and also in the demand patterns of the various sectors and it may be the result of industrial policy measures.

6. The impact of higher knowledge on the rotation of the demand and supply

Technological progress works both on the supply and on the demand side of the economy and it has a positive effect on the production of high tech goods and services, while it may have a negative impact on the low tech sectors, due to the lower demand and the increase in the wages and costs. In particular, technological change may determine a shift of both the supply and the demand schedule.

Thus, greater knowledge and technological change determines a clockwise rotation of the demand schedule, as indicated by figure 6, since the increasing knowledge and education leads the users to increase their propensity to consume high quality goods and services and decreases their demand for more traditional goods. Users are willing to pay higher prices for more qualified or more innovative goods or services and lower prices for less qualified or obsolete productions or even they do not want them anymore.

This structural change of the demand patterns may be further increased by an upward lift of the demand schedules. That, as indicated above, can be determined by an increase of the aggregate investment, as greater knowledge increases also the internal rate of return (IRR) of the investment projects by the firms.

On the other hand, greater knowledge and technological change determine both a downward shift and an anti-clockwise rotation of the supply schedule, since they determine a decrease of the costs, for a process of learning by doing and of gradual imitation, or an increase of average labor productivity (Y_i / N_i) and a decrease of the capital inputs, which are greater for the more qualified goods and services, rather than for the more traditional productions. On the contrary, the cost of these latter productions may even increase due to an increase of the minimum wage.

These two simultaneous shifts of the demand and of the supply schedule may determine the possibility to produce new high quality goods and to increase the total employment, since the intersection between the demand and the supply schedules in figure 5 shifts to the left from O_1 to O_2.

The introduction of new more qualified goods and services increases total employment and that contradicts the widely diffuse belief that technological progress determines a decrease of employment. In particular, the increase of the productions of more qualified products is usually greater than the decrease of the production of the more traditional and less qualified goods and services, as a downward shift of the demand for these latter goods and services could be at least partially compensated by the downward shift of the supply and of their costs.

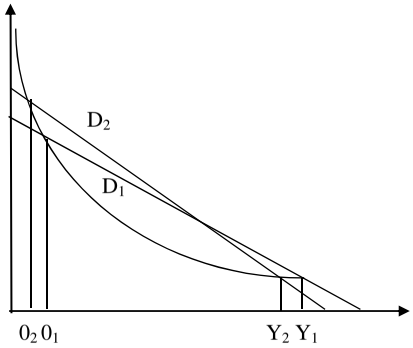

Figure 6: The effects of the evolution of the demand on the production area ($0_2 - 0_1$; $Y_1 - Y_2$)

The Schumpeterian process of "creative destruction" works both on the supply and also on the demand side. Consumptions shifts upward or toward higher quality goods and services and the demand decreases in the lower quality sectors. That creates excess capacity in these sectors and determines a disinvestment and the workers and the capital shift to the sectors where the production increases. Therefore, the model indicates the importance of policies aiming to increase the rate of knowledge creation, leading to joint shifts of the demand and the supply schedule.

7. The limits of the supply and demand policies in the traditional macroeconomic model

In the traditional macroeconomic model full employment is achieved through "structural reforms" or wage and price flexibility. On the contrary, the model illustrated above indicates that these measures do not have any long term effect in a closed economy, since prices decrease as much as wages, and also a very limited effect in an open economy, since cost competition and "beggar my neighbor" effects are limited for developed economies. Only innovation and investments, through "structural changes" or the reconversion of the firms and of labor to new productions, may increase employment and GDP in the long term.

In the traditional macroeconomic model the aggregate supply is determined by the supply of labor or by the relationship ("Phillips curve") between the increase in wages and the unemployment rate (the non-accelerating inflation rate of unemployment: NAIRU) or the ratio between current product and the "potential output". In fact, the central bankers still believe in this model and that explain why they speak more about the labor markets rather than about the demand and the supply of credit to the companies.

Moreover, since the traditional macroeconomic model is not capable to evaluate the impact of industrial policies on the GDP, these policies have almost been completely obliterated by the policy makers. On the contrary, the model indicated above focuses on the sectoral structure of the economy and on the role of innovation and investments in determining the growth of new sectors and an increase of aggregate productivity.

The "structural reforms" of the labor market introduced in recent years in all European countries have determined a decrease of the rate of increase of wages and a decrease of the costs for some firms. But they have also determined a decrease of the income of the employed workers and therefore of the demand and of the revenues of all firms. Thus, the AS and the AD schedules of the traditional macroeconomic model have both shifted downward leaving the GDP unchanged. Similarly, in the cross-sectoral model illustrated here, these policies on the labor market have also determined a parallel downward shift both of the aggregate supply and the aggregate demand schedules of figure 5, thus being incapable to increase the GDP or employment.

The "structural reforms" of the labor market have not lead to an increase of employment, as in a standard microeconomic model of the demand of labor, but to a decrease of the inflation rate and to a situation of deflation or of too low inflation. That is discouraging both firms and households to spend and has decreased the aggregate demand. Moreover, they have determined a major change of the distribution of income between the employees and the self-employed or the company profits and that has determined a decrease of consumption.

However, a selective decrease of wages may be only useful in those productions which are less efficient and may risk disappearing. Instead, contrary to the policy of "structural reforms", for the medium and high technology sectors, wages can and should be increased in Europe (as many propose in the US, Japan, UK and even in Germany), since that would stimulate the internal demand. In fact, the competitiveness of the firms in these rather advanced sectors very little depend on labor costs and much more on the use of modern technology and especially on the development of new innovative productions, which are the only one where the European economy can be competitive at the international level.

Looking to the demand side of the economy, as indicated above, investments in Euro 12 area have decreased by €370 billions from 2008 to 2013 and are the major factor of the current stagnation. Therefore, the IS and the aggregate demand schedule (AD) of the traditional macroeconomic model are practically vertical and the equilibrium is not changed by an increase of the money supply, since a lower rate of inflation and lower interest rates do not have any impact on investments and hence on GDP and employment. Similarly, also the aggregate demand schedule in the cross-sectoral model illustrated in figure 5 above is not changed by the monetary policy in the actual stagnation situation. As it is said: "it does help to bring water to a horse who does not want to drink". Only a step change in innovation, technology and consumer preferences may stimulate investments in the current situation and that may enhance a major program of private and public investments capable to increase the domestic demand and the GDP.

Companies have greatly increased their sale of corporate bonds, but not for increasing capital expenditure, but in order to restructure their debts, increase their cash deposit in the banks, invest in short term assets such as public debt and even to distribute of extra dividends to shareholders and to purchase their own shares. Only recently M&A have marginally increased. Moreover, the large supply of money created by the central banks has increased the Stock and

Bond Markets and the companies have found more profitable the financial investments rather than the risky capital expenditure. This abnormal propensity to the liquidity is the effect of mistakes in monetary policies. The European monetary authorities have forced a policy of "deleveraging" on the banks with stricter capital requirements and on the governments with the "fiscal compact" and the refusal to buy the public bonds, thus determining the "sovereign debt" crisis. The volatility of the macroeconomic environment, due to the errors and delays in macroeconomic policies, has determined a lack of confidence and a financial uncertainty, which have shorten the time perspective of firms, leading them to evaluate more the immediate costs than the medium term benefits of investments. That has compelled both the companies and also the households to "deleverage" and to postpone capital expenditure and decrease debt. Clearly if all actors save more than invest, the final effect is a recession, as the European economy represents almost a third of the world economy and can't live on a large export surplus.

The European Central Bank has focused on the labor market rather than on the financial market and an improvement of the transmission mechanism from the monetary base to the finance of the capital expenditure by the companies is still lacking after so many years of recession or stagnation. That requires new financial institutions, which can perform the role of intermediaries between the demand of funds by the firms and the supply of funds by the large commercial banks and insurance companies and other institutional investors. Monetary policy is going to only insure the financial stability of the commercial banks, but it seems un-capable to respect the goals of the inflation around 2% and to insure that the credit will reach to the real economy through the project financing.

For example, the European Central Bank could have promoted a better cooperation with the European Bank of Investments, a new regulation on the "project bonds" to be sold on the European market by the large public investment banks (Cassa depositi e prestiti, KFW, Banque publique de investissements), the creation of new Asset Backed Securities specialized in the loans to efficient and innovative firms and not only for distressed loans, the deployment of the large unspent funds by the large international Private Equity firms, the creation of a market for the "*private placement*" of the *minibonds* by the innovative SMEs, the creation of investment funds on the SMEs such as the American *Business Development Companies* and new regulations stimulating the commercial banks and the insurance companies to lend funds to these new intermediaries. In conclusions, there is need for more market-based finance to replace the retreating banks.

8. Industrial policies promoting the creation of new productions.

Investments are a very cyclical component of the demand and a major factor of the current economic stagnation. The cross-sectoral model illustrated in figures 3 and 5 above does not only clarify the limits of the actual macroeconomic policies in the Euro area, buy it also indicates the impact of a large program of innovation and investment.

First of all, greater investments determine an increase of the aggregate demand through the Keynesian multiplier and an upward shift of the demand schedule in the figures 3 and 5. That increases the revenues of all existing sectors and, in particular, it may also allow overcoming the barriers to entry in new productions, such as those, which correspond to the two B areas at the extremes left and right of the supply and the demand schedules in figure 5. These two areas respectively correspond to the adoption of the so called "smart specialization or diversification" strategy (Foray 2015, McCann and Ortega-Argilés 2015), which focuses on the high tech sectors,

or of a strategy focusing on the low tech sectors, which represent the factor of "weaknesses", rather than the factor of "strength", in a regional or national development strategy.

A second case is when investments have a specific impact on the demand of a given sector, rather than on the aggregate demand, as they improve the quality of the productions or allow introducing a product innovation. This case may be illustrated by the area B in the middle of the figure 5, which indicates a production which was not economically efficient, before the investment and the innovation. In this case, the demand was satisfied by a lower quality production (area B'). Innovation and investment lead to an increase of the price, that the users are willing to pay, and/or to a decrease of the production costs and they allow to overcome the barriers to entry into new productions. However, the new and higher quality goods and services lead to a decrease of the demand of the more traditional goods and services and, as in a process of Schumpeterian innovation, to a shift of the employment from the more traditional to the more innovative productions.

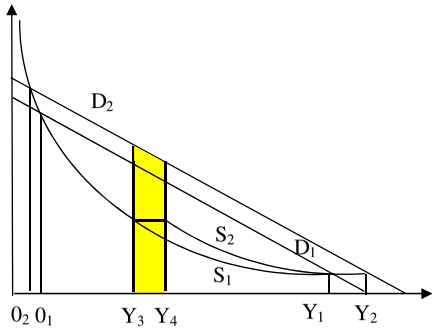

Figure 7: The effect of investment on the creation of new productions

A third case is when the new investments lead to an expansion of the production capacity in sectors, which may satisfy a completely new need or do not substitute an existing sector, thus determining an increase the overall production and employment in the economy. This case, which is illustrated in figure 4 and figure 7, implies a shift to the right of the supply schedule, starting from an intermediate price level and a specific previous production level. The new productions are represented by the shadow areas in the two figures.

In particular, as indicated in figure 7, the increase of investment in the production capacity of completely new sectors determines a shift of the cross-sectoral supply schedule to the right from S_1 to S_2 and an increase of the production in the new sectors (Y_3 - Y_4). The increase of investment determines also an increase of the cross-sectoral demand schedule from D_1 to D_2 .. The revenues of the firms in the new sectors increase, as indicated by the shaded area, and the total production of the economy increases from $O_1 – Y_1$ to $O_2 – Y_2$.

The creation of new productions corresponds to the exploitation of new segments of the demand and also to the increase of the production capabilities by the existing or by new firms. In fact, two measures are required, in order to ensure the possibility to overcome the barriers to entry into new productions: a) an initial investment in order to increase the production capacity, b) a product innovation leading to an higher price or a process innovation leading to a

lower cost. In particular, the cross-sectoral model of figures 4 and 7 indicates that the creation of new productions may be the result of three types of innovation:

a) product innovation: the increase of the quality of productions and the increase of the price that the users are willing to pay allow to overcome the barriers to entry in new productions by making prices higher than the costs;
b) process innovation: the improvement of technology allows a decrease the costs below the level of the market prices and to overcome the barriers to entry into new productions;
c) innovation in the regulation in order to exploit the synergy between the potential domestic demand and the internal production capabilities: the reciprocal coordination of the innovative producers with the innovative users allows the production of these goods and services for collective interest and to finance them either by the communities of the individual users (i.e. the case of club goods) or by the State (i.e. the case of public procurement).

In a technological perspective, the new productions develop "at the margins" of existing productions and, in fact, the shaded area in figure 7 are contiguous to the existing productions, similarly as what is indicated by the concept of "related variety" (Boschma 2013). In fact, looking on the supply side, the creation of new productions implies a reconversion of the material and immaterial resources previously used by more traditional productions and, on the demand side, they allow a better satisfaction of the emerging needs, which often are the evolution of previous traditional needs of the users. This process may also be described as a "creative destruction" process, as it implies a shift of production factors from less efficient to more efficient productions and an evolution of the consumption patterns from lower to higher quality goods and services.

In an aggregated perspective, the model indicates that the creation of new productions and the increase of the value of total production determine an increase of the incomes of the workers and of the other factors used in the production of the various sectors and that corresponds to an equal increase of the aggregate demand or GDP. Thus, demand and supply are equal at the aggregate level.

On the contrary, at the sectoral level the balance between the increased supply, determined by the increased investments, and the future demand for the same specific goods and services represents an issue for industrial and regional policy. This balance may occurs in dynamic or iterative perspective, as the availability of new productions by various innovative firms facilitates the diffusion of their use between the various innovative users ("lead users" according to Von Hippel, 1994) and, on the other hand, the existence of an emerging demand by innovative users stimulates the innovative firms to produce new goods and services. In fact, the increasing capabilities of hardware facilitate the development of more complex software, while the increased requirements of improved software stimulated the advances of hardware. That dynamic balance between the innovative demand and the innovative supply may be represented by the example of a boat with eight rows, where the four left rows pull to the right and the four right rows pull to the left, but their forces are balanced and they jointly push the boat forward, while the skipper give the timing and the direction, as also public institutions should do with their regional and industrial policies.

In fact, the complex and original combination of the new needs by the users and the improved competencies of many complementary firms and also the intelligent governance of these combinations by the public institutions seem to be the most significant dimension of the concept of "smart innovation" strategy.

The new productions may be addressed to the international market according to a traditional "export led" growth model, but they may also be addressed to the internal demand and aim to exploit untapped opportunities in the large domestic market of the European economy. In fact, the needs and the behaviors of the citizens and the users are quickly changing and often anticipate the investments by the producers and the policies by the institutions.

A different and important case is when the new productions are not addressed to the individual demand of numerous users, but aim to respond to the implicit collective needs of large local communities. That is the case of the production of "common goods" (Becchetti et al. 2008) or "club goods", which aim at improving the well-being of the citizens in a strategy of sustainable and inclusive economic development. In the case of the "common goods" the demand can only be satisfied by aggregating the individual demands and the vertical summation of the prices, which the users would be willing to pay, should be equal to the production costs of the good or service, which is jointly used. These goods are characterized by positive externalities in consumption and economies of scale in production. The need for investing in the production of new "common goods" is demonstrated by the undercapitalization and the process of restructuring in the European urban areas, where congestion represents a constraint to development and the quantitative and qualitative indicators of well-being are inadequate. Examples are the investment in: transport and communication, environment, health, culture, sport, tourism. Thus the collective needs of the citizens in the large European urban areas indicate the existence of unexploited opportunities for greater private and public investments.

The case of "common goods" is more complex than that of "private goods" since not only the latent demands of the final users have to be anticipated, but also there is the need for institutional regulations, which allow to aggregate, either vertically or horizontally, the individual demands and also allow to coordinate the various firms and institutions, which have to cooperate in the case of large and complex and long term investment projects, characterized by large economies of scale and network economies. In this case, the use of public subsidies to the users or to the producers is often needed, at least in an initial period, in order to exploit the learning economies by the users and/or by the producers and to avoid that the investment projects are abandoned, as the short term costs are overestimated with respect to the medium and long term benefits. In particular, the public institutions, together with the university research centers, have a crucial role in the governance of these projects, as they should launch the original idea and then promote the coordination of many private stakeholders and also finance the long and fundamental phase of research and technical design phase, when private investors are often reluctant to commit their funds.

Moreover, industrial and regional policies are needed in the governance of the financial relations between the industrial and service firms and the financial investors, such as the commercial banks, the insurance companies and the pension funds. In fact, a recovery of investments in Europe is hindered also by the failure by the monetary authorities in insuring a balance between the demand and the supply of funds for capital expenditure. "Structural reforms" in the capital markets and in bank industry in Europe are required and also the creation of new financial intermediary organizations, which are still lacking in a mainly bank based system, such as that in continental Europe.

9. Industrial policies promoting new sectors through taxes and incentives

Monetary subsidies to the producers or monetary incentives to the users represent a different instrument of industrial and regional policy, with respect to additional investment in product or

process innovation and in capital expansion. Public intervention may stimulate the creation of new productions either through subsidies to the producers (lowering the supply schedule) or with incentives to the users (increasing the demand schedule). The respective cost for the public budget may be financed either with direct taxes on the producers (workers, capital owners and firms) or with indirect taxes to the users. These public interventions promote the creation of new productions and the increase of employment, as also an increase of the PIL.

The use of these instruments are tightly related to the areas, which in the model of figure 5 indicate that the demand schedule is lower with respect to the supply schedule. The areas B (and also the area B') indicate also the revenue of a possible tax, which would not decrease the well-being of the users but only the rent of the producers. This tax could be used by the State in order to subsidize the production of innovative sectors, which have too high production costs. For example, taxes on the high prices of electric energy could be used in order to finance the development of new productions, such as energy networks or renewable energies. In some cases, the domestic production capacity may exist but it may not be activated since the prices that the consumers are willing to pay are too low or the costs are too high, as in the case of education, culture, health, environment protection, etc. and many other goods, that the citizens consider as "public goods" and they are not willing to contribute to the cost or only in a minimal part.

Otherwise, the tax can be used in order to reduce the market price of new goods and services and/or to increase the revenues and the demand by the households. For example, the too high tolls on private highways are determined by a natural monopoly and are very similar to a tax, since they can almost not be avoided by the citizens. That decreases the purchasing power of the households and the internal consumption of other useful goods or services, produced in competitive markets.

Industrial policies may directly intervene with monetary subsidies and incentives and promote (for a limited time) a convenience by the firms (downward shift of the supply) and by the users (upward shift of the demand) for specific new productions. With time the firms could learn to increase the productivity orate f these productions and the many more traditional users could imitate the behavior of the few most innovative users. Clearly, industrial and regional policy have distributive effects and may improve the well-being of the users and decrease that of some producers.

10. Conclusions

The model illustrated in this paper indicates the relationships between the level of GDP and the price of production and it is similar to the traditional macroeconomic model of the aggregate demand and supply. However, traditional mainstream economics underestimates the role of the sectoral structure of an economy and that that explains why it does not consider the role of industrial and regional policies.

The traditional macroeconomic model aims to explain the effects of monetary and fiscal policies on the short term changes of income and employment level. On the contrary, this model focuses on the impact of technological change, innovation and investment on the medium term level of employment and income.

In particular, a major difference of the cross-sectoral model of the aggregate demand and supply illustrated in this paper with respect to the traditional macroeconomic model is, first of all, the

form of the aggregate supply schedule, which is not based on the neoclassical theory of labor markets, but on the production capacity and the cost structure of the various sectors of the economy. Secondly, on the demand side, the model illustrates that new knowledge and innovation may be a very important factor in determining an increase aggregate investment and the level of aggregate demand and GDP, due to their effects on the expected costs and on the expected demand of the firms, much more than a minor decrease of rate of interest determined by an expansionary monetary policy.

Differently from the traditional macroeconomic model, this model allows to illustrate important factors of development, such as the change in the sectoral structure of the economy, the profitability of the productions in the various sectors and the barriers to entry into new productions.

This model, by explicitly considering the sectoral structure of the economy, aims to guide industrial policies, which are selective by nature and should focus on the demand and the production capacity of specific high, medium and low tech sectors. In particular, this model illustrates a theoretical and statistical framework, which may help in the evaluation on the effects of industrial and regional policies on the macroeconomic objectives of GDP, employment and inflation. Therefore, the model also illustrates the need to rediscover the role of industrial and regional policies as a crucial national and European policy, complementary to the traditional monetary and fiscal policies.

In particular, in the most developed economies the higher level of knowledge of population implies that the changes in the demand anticipate the changes in the supply. Given the almost saturation of the demand of the traditional goods and services, growth policies should aim to satisfy the new unsatisfied needs of the citizens, which may represent a new opportunity for jobs for thousands of increasingly qualified workers. The expectations by the innovative firms on the new needs by the citizens and on the possible growth of new productions may lead the firms to the design of innovative investment projects and to demand new funds to the financial markets. Once these projects are realized they increase the supply of new competitive productions. Moreover, the revenues created by the new jobs and the investment made in order to create them are capable to sustain the aggregate demand and to increase the revenues of the firms in the various sectors of the economy. That may leads to validate the expectations by the innovative firms on the market demand of new product and services.

This model indicates that in the actual long term stagnation of the European economy the expansionary monetary policies and the policy of "structural reforms" on the labor market have demonstrated to be ineffective and can't increase the GDP, due to the fall in the propensity to invest by the private companies.

The failure of the traditional macroeconomic policies indicates the need to find alternative policies, such as industrial and regional policies. Only the creation of new productions can increase the employment and that requires first of all innovation and new investments. Only a step change toward more innovation in the production technologies and in the consumer preferences may stimulate investments in the current situation and that requires and also enhances a major program of private and public investments capable to increase the domestic demand and the GDP.

The task of industrial policy is to promote a change in the sectoral structure of the economy and a dynamic adjustment of the demand and supply in the various sectors, leading to the creation

of new productions and to the increase both of employment and of the average productivity of the economy.

The change in the structure of the demand due to the evolution of the needs of the users should correspond to the evolution of the competencies of the producers and the change within the supply, shifting resources from the sectors with lower productivity to sectors with higher productivity. This dynamic process of interdependent development of the demand and of the supply of new productions within an individual national or regional economy increases the per capita income, quite independently from the effect of the exports to the external markets.

That dynamic balance between the innovative demand and the innovative supply may be represented as a boat with eight rows, there the four left rows pull to the right and the four right rows pull to the left, but their forces are balanced and they jointly fast push the boat forward, while the skipper give the timing and the direction, as also public institutions should do with their regional and industrial policies.

The model indicates a new approach in the policy for the recovery of the European economy. That implies a change of course from an emphasis on the aggregate supply to an emphasis on the aggregate demand, from a focus on the labor markets and labor costs to a focus on the capital markets and the supply of finance, from an increased international competitiveness to the growth of the European internal demand, consumption and investments, from an overall "quantitative easing" of the money supply to a reorganization of the financial intermediaries specialized in the investment finance in the industrial and service firms.

The expansionary monetary policy of the ECB has been ineffective in promoting a recovery of investments and the "Fiscal Compact" regulation represents a constraint on a large scale use of the neoliberal policies aiming to a decrease of taxes and on the neo-keynesian policies aiming to an increase of public expenditure and public investments. Therefore, the most appropriate policy is a major plan of private investments supported by the extraordinary liquidity existing in the international capital markets, such as that indicated by the new elected President of the European Commission, Jean-Claude Juncker (European Commission 2014).

However, the real challenge of the industrial and regional policies in Europe is to tackle two related problems. First of all, the need to define a "structural reform" of the financial sector (rather than a "structural reform" of the labor market), in order to insure an effective transmission mechanism of the monetary policy on the real economy. That requires to change the actual structure of the incentives and of the fiscal regulations in the financial markets, as they make more convenient to the firms to invest in short term assets rather than on innovation for medium term profits.

Secondly, there is the need to define new governance mechanisms (i.e. a modern industrial and regional policy), which promote the design of very innovative investment projects in the various regions and countries, having a high rate of financial return for the private industrial and service firms.

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APPENDIX

Table 1.1

Euro countries 12	2008	2013	Difference 2008-2013	Growth rate 2008-13	Share 2013	Change in share 2008-2013	Contribution to GDP growth
Gross domestic product at market prices	8.577.351,9	8.394.525,4	-182.826,5	-2,13	100,00	0,00	-2,13
Household and NPISH final consumption expenditure	4.787.620,7	4.706.392,6	-81.228,1	-1,70	55,82	0,25	-0,95
Final consumption expenditure of general government	1.758.938,1	1.806.121,5	47.183,4	2,68	20,51	1,01	0,55
Gross capital formation	**1.864.302,3**	**1.494.421,7**	**-369.880,6**	**-19,84**	**21,74**	**-3,93**	**-4,31**
Exports of goods and services	3.556.620,4	3.842.499,6	285.879,2	8,04	41,47	4,31	3,33
Imports of goods and services	3.388.448,2	3.450.241,2	61.793,0	1,82	39,50	1,60	-0,72
External balance of goods and services	168.172,2	392.258,4	224.086,2	133,25	1,96	2,71	2,61
Source: elaboration on Eurostat data							

Table 1.2

United States	2008	2013	Difference 2008-2013	Growth rate 2008-13	Share 2013	Change in share 2008-2013	Contribution to GDP growth
Gross domestic product at market prices	10.965.461,1	11.616.051,0	650.589,9	5,93	100,00	0,00	5,93
Household and NPISH final consumption expenditure	7.421.193,7	7.934.741,6	513.547,9	6,92	68,31	0,63	4,68
Final consumption expenditure of general government	1.672.810,9	1.659.521,6	-13.289,3	-0,79	14,29	-0,97	-0,12
Gross capital formation	**2.277.754,6**	**2.324.005,9**	**46.251,3**	**2,03**	**20,01**	**-0,77**	**0,42**
Exports of goods and services	1.325.328,2	1.537.740,1	212.411,9	16,03	13,24	1,15	1,94
Imports of goods and services	1.733.118,1	1.839.958,2	106.840,1	6,16	15,84	0,03	-0,97
External balance of goods and services	-407.789,9	-302.218,1	105.571,8	-25,89	-2,60	1,12	0,96
Source: elaboration on Eurostat data							

Table 1.3							
Japan	**2008**	**2013**	**Difference 2008-2013**	**Growth rate 2008-13**	**Share 2013**	**Change in share 2008-2013**	**Contribution to GDP growth**
Gross domestic product at market prices	3.786.853,5	3.838.990,1	52.136,6	1,38	100,00	0,00	1,38
Household and NPISH final consumption expenditure	2.150.623,3	2.291.049,3	140.426,0	6,53	59,68	2,89	3,71
Final consumption expenditure of general government	682.523,9	746.736,6	64.212,7	9,41	19,45	1,43	1,70
Gross capital formation	**825.021,6**	**742.955,8**	**-82.065,8**	**-9,95**	**19,35**	**-2,43**	**-2,17**
Exports of goods and services	638.693,5	608.529,0	-30.164,5	-4,72	15,85	-1,01	-0,80
Imports of goods and services	510.008,8	550.280,6	40.271,8	7,90	14,33	0,87	-1,06
External balance of goods and services	128.684,7	58.248,4	-70.436,3	-54,74	1,52	-1,88	-1,86
Source: elaboration on Eurostat data							

Table 2								
Euro area (12 countries)	**Productivity**	**Employment**	**Product change**	**Product change**	**Productivity change**	**Productivity change**	**Employment change**	**Employment change**
	2013	**2013**	**2008-00**	**2013-08**	**2008-00**	**2013-08**	**2008-00**	**2013-08**
Real estate activities	694,78	1.214,50	15,71	3,89	- 2,85	10,45	19,11	- 5,93
No manufact. industry	122,63	1.774,20	9,12	- 1,98	9,43	- 2,79	- 0,28	0,84
Financial and insurance activities	110,86	3.927,90	22,53	1,07	18,05	3,42	3,79	- 2,27
Information and commun.	104,33	3.925,50	45,81	7,15	30,64	7,57	11,61	- 0,40
Industry (except construction)	67,96	21.729,10	11,29	- 3,55	17,67	6,66	- 5,42	- 9,58
Manufacturing	63,10	19.954,90	11,67	- 3,82	18,54	7,34	- 5,80	- 10,40
Total - All NACE activities	53,95	140.728,10	15,51	- 1,68	6,06	1,82	8,91	- 3,44
Professional, scientific and technical activities; administrative and support service activities	43,68	17.899,30	20,35	- 1,05	- 9,70	- 3,57	33,27	2,61
Public administration, defence, education, human health and social work act.	43,51	33.420,10	12,31	3,82	2,04	1,88	10,07	1,90
Construction	43,16	8.733,20	9,49	- 21,14	- 0,20	0,36	9,72	- 21,42
Wholesale and retail trade, transport, accomodation and food service activities	41,24	34.533,00	16,14	- 4,31	4,74	- 1,41	10,89	- 2,94
Agriculture, forestry and fishing	28,04	4.710,30	5,46	- 6,81	22,56	1,55	- 13,96	- 8,23
Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies	25,15	10.635,10	11,91	- 0,42	- 4,61	- 2,75	17,32	2,39
Source: elaboration on Eurostat data								

Table 3

Italy - Gross fixed capital formation

(Nace Rev.2)	Growth rate 2008-2013	Absolute change 2008-2013	Share of the absolute change
Total economic activities	-23,84	-72.637,73	100,00
Agriculture, forestry and fishing	-20,90	- 2.253,23	3,10
Mining and quarrying, Electricity, gas, steam and air conditioning supply, water supply; sewerage, waste management and remediation activities	-29,40	- 4.230,14	5,82
Manufacturing	-27,70	-15.999,76	22,03
Construction	-30,46	- 3.599,30	4,96
Services	-22,18	-46.566,58	64,11
Wholesale and retail trade; repair of motor vehicles and motorcycles, Transportation and storage, Accommodation and food service activities	-24,87	-13.640,04	18,78
Information and communication	-5,37	- 743,15	1,02
Financial and insurance activities	-42,13	- 2.161,40	2,98
Real estate activities	-25,60	-22.522,12	31,01
Professional, scientific and technical activities, Administrative and support service activities	-16,27	- 2.313,67	3,19
Public administration and defence; compulsory social security, Education, Human health and social work activities	-14,99	- 4.371,36	6,02
Arts, entertainment and recreation, Other service activities	-8,04	- 388,03	0,53
Source: elaboration on Istat data			

Table 4

ITALY	Fixed assets 2012	Average net investment 2007-2008	Net investment 2012	Change of fixed assets 2008-2012
Total - All NACE activities	8.687.273,6	151.918,00	70.513,4	4,5%
Agriculture, forestry and fishing	431.693,5	182,90	-3.511,4	-2,2%
Mining and quarrying	57.563,7	573,15	-128,2	0,2%
Electricity, gas, steam and air conditioning supply	163.209,0	878,90	-3.399,0	-5,9%
Water supply; sewerage, waste management and remediation activities	93.659,0	1.611,55	327,9	3,5%
Manufacturing	1.050.662,1	11.074,00	-4.584,2	-0,6%
Construction	219.255,0	6.284,10	1.262,4	4,1%
Wholesale and retail trade; repair of motor vehicles and motorcycles	387.515,1	10.365,10	4.097,4	6,3%
Transportation and storage	509.873,5	14.082,20	7.794,6	8,3%
Accommodation and food service activities	198.953,0	6.344,55	1.555,7	4,4%
Information and communication	163.577,5	2.914,75	2.495,5	8,4%
Financial and insurance activities	130.412,9	2.119,65	527,5	3,0%
Real estate activities	3.776.933,3	68.768,80	50.941,9	6,4%
Professional, scientific and technical activities	109.454,5	2.914,10	1.152,1	6,5%
Administrative and support service activities	97.925,5	4.520,10	699,5	6,4%
Public administration and defence; compulsory social security	1.016.255,6	13.101,65	4.803,1	3,5%
Education	61.938,5	1.008,00	1.366,0	10,4%
Human health and social work activities	113.679,1	2.477,75	3.128,9	14,5%
Arts, entertainment and recreation	71.328,0	1.709,35	1.493,9	10,5%
Other service activities	33.863,6	1.069,35	504,1	8,3%
Source: elaboration on Eurostat data				