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STRUCTURAL CHANGE, EMPLOYMENT, AND INSTITUTIONS*

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The aim of this paper is to consider the role of institutions in the process of structural change with regard to composition and level of employment. Contrary to the standard neoclassical growth theory, since both technical progress and the growth in demand are not uniform in all sectors, the combination of disproportional changes in technology and disproportional changes in demand results in disproportional growth and deep changes in the structure of the economy, as well as in the level and composition of employment. The paper points out some "institutional" factors that deeply influence, on the one side, the intensity and the direction of technical progress in each sector and, on the other side, the composition of final demand, which are the roots of structural change. Finally, some indications are drawn about the possibility open (or, to say it better, "left" under the constraints of globalised markets) for every single country to govern the process of structural change through acting on these institutional factors.

Scopo di questo saggio è riflettere sul ruolo delle istituzioni nel processo di cambiamento strutturale e nelle sue implicazioni sulla composizione e sul livello dell'occupazione. Contrariamente alla visione neoclassica standard della teoria della crescita, poiché né il progresso tecnico né la crescita della domanda sono uniformi nei diversi settori dell'economia, la combinazione di cambiamento tecnologico ed espansione della domanda non uniformi genera un processo di crescita non-proporzionale e profondi cambiamenti nella struttura dell'economia come pure nel volume e nella composizione dell'occupazione. Nel saggio viene richiamata l'attenzione su alcuni fattori "istituzionali" che influenzano profondamente sia l'intensità e la direzione del progresso tecnico in ciascun settore, sia la composizione della domanda finale, in altre parole le radici del cambiamento strutturale. Infine, vengono svolte alcune considerazioni sulle possibilità che si aprono (o, per meglio dire, che sono consentite dalla globalizzazione dei mercati) ai singoli Stati per governare il processo di cambiamento strutturale operando sui fattori "istituzionali" menzionati.

Introduction

The aim of this paper is not so much to describe the structural changes that have occurred (or that are occurring) during a certain period of time, but rather to detect the dynamic forces that drive the process of structural change, and to detect the institutions that influence these forces and therefore the areas in which the State can play a role in governing the process.

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With this aim, the paper is organised as follows. The first section is devoted to clarifying the concept of structural change and to placing it in the contest of growth theory. Technical progress and demand expansion are considered uniform through the economy both in neoclassical models (in which the aggregate production function implies variable coefficients of production but is framed within the hypothesis of neutral technical progress *à la* Hicks) and in models *à la* Leontief (where the production system shows fixed coefficients of production and where growth is supposed to leave the internal proportions unchanged). On the contrary, the original Pasinetti's approach shows that the combination of disproportional changes in technology and disproportional changes in demand among the various sectors results in a disproportional growth of the economy and in a deep change in its structure.

The second section elaborates on Pasinetti's approach in search of understanding the process of structural economic dynamics. Both the supply side and the demand side aspects are considered, although it is always the increase in productivity combined with Engel's law that causes a change in the composition of aggregate demand and consequently different rates of investment and growth in different sectors, creating in this way problems for macroeconomic and employment stability.

The third section is devoted to discovering the "determinants of the determinants" of structural change in order to suggest possible areas of public intervention for governing and somehow directing the process of change. In this light, the attention is concentrated on the role of institutional factors, such as the trade regime, the degree of monopoly, the degree of income inequality, the industrial and innovation policy, public consumption, and welfare state policy. All these factors may deeply influence, on the one hand, the intensity and the direction of technical progress in each sector and, on the other, the composition of final demand, significantly affecting the evolution of structural change.

Finally, the fourth section deals with the possibilities open (or, rather, simply "left" under the constraints of a globalised economy) for every single country to effectively act on such institutional factors in order to manage the process of structural change of its own economy. The fifth section is a brief conclusion.

1. The concept of structural change

Structural change can be defined and measured, in global and static terms, as half the sum of the absolute values of the differences in sectorial value added shares over time. This calculation avoids that differences in sign cancel each other:

$$\frac{1}{2} \sum x_{i,t} - x_{i,t-1}$$

where x_i are each sector's shares of total value added at times t and t-1.

Of course, this measure encounters two serious problems, which must be adequately solved in order to obtain a significant index of structural change. The first is the problem of changes in relative prices, and the second is given by the changing boundaries and aggregations of sectors over time.

Once these problems are solved, the index represents a synthetic measure of the intensity of structural change over a period of time in aggregate terms; however, the

actual change of the structure of the economy can be seen only by looking at the full input-output table.

The change of the structure of the economy does not appear in standard models of growth: growth is always considered equiproportional in the sense that all sectors are assumed to grow at the same rate. In neoclassical models *à la* Hicks, where an aggregate production function with elasticity of substitution is assumed, this is due to the assumption of neutral technical progress. In the Harrod model, the assumption of fixed coefficients of production discards the hypothesis of non-proportional growth. Therefore, generally, structural dynamics is not embodied in growth models.

On the other hand, other models adopt a structural view of the economy but without considering growth. Sraffa (Sraffa, 1963), for instance, deals with the frame of structural interdependence, but no change in the volume of production is present in his model. Nevertheless, his model is a good starting point for combining the two aspects (growth and structural change) and for enlightening the process of structural dynamics.

The structure of the economy is given by:

$$A\,Q' + PN' = Q'$$

where A is the matrix of technical coefficients of production, Q' is the vector of final production, and PN' is the net product vector, since $A\,Q' < Q'$.

The process of structural dynamics *à la* Pasinetti (Pasinetti, 1983) can be viewed considering that changes in the vector of final demand PN' will determine changes in Q' (final production). In fact, since $PN' = Q' - AQ'$, $PN' = (1-A)\,Q'$ and therefore $Q' = (1-A)^{-1}\,PN'$. But changes in the final production will mean changes in the allocation of capital and labour in different sectors, and this in turn will imply different rates of investment and technical change in different sectors and consequently a change in the whole matrix of technical coefficients A as well.

Consequently, given the disproportional growth of final demand implied by the Engel's law, we have necessarily disproportional rates of investment and productivity increase in different sectors, and consequently disproportional and unbalanced growth associated with a continuous structural change of the economy.

Without entering into the details of the structural changes that have occurred in recent and less recent times (since the aim of this paper is not to describe the changes but to analyse the process of change and its driving forces), we can just mention the main, and well-known, stylised facts.

First, the employment share of the agricultural sector generally declines during the development process.

Second, the employment share of the manufacturing sector increases in the early stages of development ("industrialisation") and decreases in later stages ("tertiarisation").

Third, the employment share of services increases during the development process (with a boost of the financial sector in more recent times)[1].

It has to be stressed, though, that, although these are general trends of the structural change worldwide, each country, each economic system, boasts particular and specific features of change. It is precisely in order to understand and explain the specific shape

[1] These general trends have been detected since the early works of Kuznets (1966) and Chenery (1968), and are also confirmed in more recent studies (Maddison, 1991, 2003; Haraguchi, 2010).

that the structural change takes in different countries that the discovery of the driving forces of the process of change is needed. Therefore, we have to turn now to consider the determinants of structural change. However, we should anticipate from now that spotting the explanatory factors will not be enough. If we are in search of elements for economic policy based on solid ground, we have to push the investigation further: we have to explore a second level of the causation chain, that of the "determinants of the determinants", because it is on them that public policy should act in order to manage the process of structural change.

2. The process of structural economic dynamics

As far as the determinants (i.e. the driving forces) of structural change are concerned, two main, and perhaps opposite, views can be considered. The first one is the demand side view. According to this view, structural change, that is the disproportional evolution of the sectoral composition of national output, is a by-product of growth.

The existence of non-homothetic preferences implies that, with increasing income levels, the increase in aggregate demand, and therefore in the general level of activity, is disproportionally distributed across different sectors. Different factor intensities together with different rates of technical progress in different sectors give this disproportional increase in aggregate demand the effect of changing the whole structural interdependence table of the economy. The composition of the final production will change, and so will the allocation of capital and labour among sectors.

It is important to point out that this process, according to Pasinetti's view, implies three particular structural features. First, different rates of profit will appear in different sectors; second, different rates of investment will take place in different sectors; third, the structure of relative prices will be altered. Therefore, the whole structure of the economy will undergo deep transformations; capital, consumptions, and output will not grow at the same constant rate all over the economy. In conclusion, the growth path is fundamentally unbalanced.

However, there is a second view, which we may call a supply side view, that sees a reverse direction of the causality chain. It is a view that can be traced in relation to several and well-known interpreters of the evolution of the economy all over the world. According to Rostow (1960), Kuznets (1966), and Chenery (1968), for instance, it is growth that is the result of changes in the sectoral composition of output, rather than the other way round. According to their findings, the origin of the growth process has to be seen in the flow of capital and labour from less to more productive sectors. This movement raises the overall productivity, and this in turn raises per capita income, demand, investment, and growth. Actually, some matching between this view and empirical evidence can be found. On the same ground, a process of decline can be explained by opposite flows of capital and labour. In fact, the slowdown and also the decline of some economies in the context of globalisation may be often attributed to a movement of capital and labour from more productive sectors (swept away by hard international competition) to less productive sectors (such as traditional service sectors and poor local unskilled manufacturing)[2].

[2] The Italian economy, for instance, shows some signs of a negative process of this kind – see Tridico (2014); in several Latin American and Africa countries, instead, this process is due to reallocation of workers displaced by high

After all, this view is more compatible with the traditional neoclassic approach. In fact, it shares the view of market clearing prices and of the working of a self-adjusting and equilibrating mechanism.

And, actually, it is on this ground that Acemoglou (Acemoglou and Guerrieri, 2008), although admitting the existence of unbalanced growth process in the short run, seems to believe in the automatic achievement of balanced growth in the long run. This is exactly the opposite of Pasinetti's view, according to whom disequilibrium and instability are the permanent state of the economy[3].

The distinction between supply side and demand side views concerning the driving forces of structural change does actually fade away when we consider at a deeper level the approach of Pasinetti. In a latter contribution (Pasinetti, 1993), he focuses the analysis on the role of "learning", and in this light a strong interactive relationship is envisaged between, on the one hand, the change of coefficients of production due to technical progress and, on the other, the changing composition of consumer demand, both stimulated and shaped by the process of "learning"[4]. It is their uncoordinated interaction that results in permanently disproportional and unbalanced growth.

As it can be seen from Q' = A Q' + PN', structural change could occur in two different hypothetical situations: a) without changes in demand composition if changes in the matrix of coefficients of production due to technical progress take place; b) without changes in the matrix of technical coefficients if changes in the vector of final demand due to consumer demand occur. The combination, or better the interaction, between the two opens the way to a process that can be called of "cumulative causation", which operates through a kind of multi-sectoral multiplier. The multi-sectoral multiplier mechanism means that any increase in expenditure in one sector spreads its multiple effects in other sectors according to their own income elasticities of demand, which are bound to change, according to Engel's law, differently in different sectors as aggregate growth takes place. This mechanism in turn develops a cumulative causation process, in the sense that the sectors with higher expansion in demand will have higher capital investments and higher increases in productivity, which will cause new increases in income levels and in demand according to sectoral income and price elasticities[5]. Changes in elasticities, on the other hand, will set in motion new disproportional dynamics, which will strengthen the character of persistent unbalance in the process of growth.

The above interaction is stimulated by factors lying on the demand side and on the supply side of the determinants. Detecting these factors is important not only for the sake of better understanding the process of structural change, but also for the purpose of being able to choose the appropriate policy measures for managing this process.

If we consider an economy open to international exchanges, the first of these factors is foreign trade. The balance of trade, actually the structure of imports and exports, does have a significant impact on final demand. The income and price elasticities of imports and exports will contribute to modelling the cumulative causation process, so influencing the growth, or decline, of different sectors[6].

productivity increase in sectors affected by foreign direct investment (FDI) and technology transfers: see Rodrik (2014). For a deep theoretical treatment of these inter-sectoral movements, see Ngai and Pissarides (2007).

[3] This view has been recently stressed, among others, by P. Leon: see Leon (2014).

[4] On the central economic role of learning in present-day economies, see also: Greenwald and Stiglitz (2018).

[5] For some interesting empirical examinations of the elasticities issue, see Bosworth (1987) and Parker (1992); for an extensive treatment of the multiplier in this perspective, see Trigg and Lee (2005).

[6] These aspects are deeply considered in Thirlwall (2013).

Also on the demand side, a second factor of utmost importance is the distribution of income. Since the aggregate effect of the Engel's law is the sum of its operation at individual level, income distribution, in addition to simple per capita income, clearly plays a significant role in the sectoral composition of final demand.

Demographic changes are a third important factor. The patterns of consumption significantly differ among people of different ages. Therefore, a changing age composition of population undoubtedly implies changes in the structure of aggregate consumer demand.

Finally, autonomous evolution of tastes may alter the individual sectorial allocation of consumption expenditure of the same disposable income. The term "autonomous" cannot be taken here in its absolute sense. For the evolution of tastes to materialize, the actual availability of new products up to then unavailable and, often, the influence of marketing strategies are determining factors.

Turning to the supply side, several determinants of the interactive process of structural change can also be detected. As we have already said, a shift of labour or other productive resources between sectors is able, given the differences in the level of productivity among sectors, to raise or to lower the overall productivity level. This process will impact on the rate of growth and consequently on the structural change of the economy.

A second important factor, from the supply side, can be seen in exogenous technical progress. Pasinetti's view on this issue is rather ambiguous. In fact, in spite of assuming as given the changes in technical coefficients of production, he repeatedly stresses that "the relevance itself of technical progress depends on potential demand, […] any investigation into technical progress must necessarily imply some hypotheses (and if not explicitly it necessarily does so implicitly) on the evolution of consumers preferences as income increases" (Pasinetti, 1983, p. 69). It must be recognised that, because of the so called "fourth industrial revolution", this statement may be reasonably pushed as far as to admit not only the existence of "some hypotheses on the evolution of consumers preferences", but even a perfect forecast of such evolution if not its actual manipulation and construction by the producers. This fact goes beyond the old story of "hidden persuaders" and the old marketing techniques; it is a question of the present "revolutionary" use of "big data". Surely, producers' expectations about the evolution of demand may lead the process of innovation, but it does not necessarily need to be so; it is sufficient to assume the existence of a cost-reducing effect of technical progress and of a strong competitive Schumpeterian market in order to explain the impulse towards the adoption of technological innovation[7]. Therefore, in the light of the "permanent learning process" explored by Pasinetti, it seems possible to speak in this sense of endogenous technical progress as a trigger of the cumulative causation process of structural change.

Even according to more recent approaches, economic growth is considered fundamentally linked to structural change via the different rates of technical progress taking place in different sectors. "Countries' economic growth is largely expected to be related to processes of structural change which are in turn due to sectoral differences in innovation activities." (Malerba, 2004, p. 1051) These "differences in innovation activities" are explained in terms of "sectoral systems of innovation", rather than with the old

[7] In this regard, it is worth mentioning that, from the well-known "productivity function" of Sylos Labini (1999, p. 259), it can be deduced that firms are pushed into adopting labour-saving innovations simply by the difference between wages and price of machinery and also by the absolute labour cost, regardless of expectations about consumer demand. An analysis of the role of Sylos Labini's productivity function in the explanation of the Italian productivity stagnation has been conducted by Tronti (2009 and 2010).

approach of "regional systems of innovation" or the "milieu innovateur". According to this view, the differences among "sectoral systems of innovation" can be traced in three fields: knowledge and technological domain; actors and networks; and institutions. All of these fields show specific features in different sectors and countries, and this fact seems to be, according to this approach, the root of structural change of the economy.

Having depicted the substance of the process of structural change, let us turn now to consider its implications for the quantitative dynamics of employment.

If growth with structural change takes place, it is clear that growth cannot exceed the rate at which the quantity of labour required would exceed the quantity of labour available in the economic system; therefore, it must be: $l\,Q' \leq L$ (where l is the vector of labour coefficients, and L the total amount of labour available). On the other hand, if the initial condition is one of full employment, in order for full employment to be maintained, it must be: $l\,Q' = L$; this means that, given the changes in the vector of labour coefficients and in the matrix of technical coefficients, only appropriate changes in final demand (which actually could be calculated in a multi-sectoral model) will be consistent with maintaining full employment. If the sectoral composition of production were to remain unchanged, this would imply a growth of the demand coefficients proportional to the reduction of the labour coefficients determined by technical progress. This by itself would create problems, since no demand coefficients can increase indefinitely at the same speed of technical progress. Moreover, the fact that both the sectoral composition of final demand, and the matrix of technical and labour coefficients do change with growth creates a more problematic situation. Indeed, the increase in demand coefficients of old goods and services could likely not be sufficient to make sure that the quantity of labour required equals the quantity of labour available. This equivalence would then be conditional on an appropriate increase in demand for new goods and new services, which, similarly, it is not sure will happen.

At this point, it must be specified that the "quantity of labour available" is the product of the standard working time per worker multiplied by the labour force. So, in case the increase in final demand should fall shorter of what is required for maintaining full employment, an appropriate change in working time per person could become necessary in order to convert the required *amount of labour* into the *amount of workers* required to keep all the labour force employed. Here the issue of the so-called "technological unemployment" cannot be avoided. It is not possible to dismiss the problem simply by trusting in the working of a permanent self-adjustment mechanism or by invoking the experience of the past. The nature and the scope of the so-called "fourth industrial revolution", and the growing diffusion of cyber-physic systems are phenomena so new that no lessons can be drawn from the past about their effects. If the goal of full employment is not to be abandoned, and the increase in final demand is not enough for this purpose, there seem to be but two directions of policy measures left: either the engagement of the State as "employer of last resort", or the institutional shortening of the working time[8].

It could be possible to work out, through a multi-sectoral model *à la* Pasinetti, the proper combination of the three variables (more demand for old goods and services, new demand for new goods and services, and shorter working time) required to cope with technological unemployment. An exercise of this kind is beyond the scope of this paper, but it is within our scope to emphasise that, although such necessary adjustments

[8] There is a huge literature on these fields. As to the former, along the lines of Minsky's well-known idea, see a positive proposal in Wray (1998) and a critical view in Sawyer (2003); as to the latter, see Fadda (2016b).

could take place in the long run, they are neither necessarily automatically achieved nor necessarily achieved at all. On the contrary, according to Pasinetti, "the fulfilment of condition (13) (ie. the above aggregate condition on employment and expenditure)[9] by no means entails an automatic self-adjusting process. The spontaneous forces operating behind it are in fact tending to make it *not* satisfied" (Pasinetti, 2007, p. 285), and so we must consider "disequilibrium and instability (not equilibrium) as the normal state of the industrial economies" (Pasinetti, 2007, p. 229). Since consumers must "learn" how to spend their increased incomes, and producers must anticipate consumers new preferences, lack of coordination is bound to create unbalances and mismatches. As a consequence, the transition from one structural composition to another, both in final production and in the matrix of coefficients, is likely to create unemployment, instability, and significant changes in fundamental macroeconomic variables, such as the shares of wages, profits, and rent in national income, as well in personal income distribution. Such distributional changes, in turn, affect both the level of aggregate demand, and the expenditure patterns in consumption and in investment, feeding the cumulative causation process of structural change.

Before considering the state intervention as employer of last resort or as imposer of working time reduction to cope with the failure to achieve full employment, it is wise to see whether this process of cumulative causation of structural change can be managed in order to get closer to fulfilling that normative central "condition (13)" through policy and institutional measures acting on those factors previously mentioned as driving forces, i.e. on the determinants operating from the demand side and from the supply side.

A first level of dealing with the problem of structural change is simply to cope with its consequences. This action should basically be oriented in two directions. The first is the reduction of the "adjustment costs" for industrial restructuring, which implies the removal of all obstacles that make it difficult for capital and labour to move from declining to growing sectors and from old to new technologies. The second is to avoid mismatches between demand and supply in the labour market: this implies a timely and efficient adjustment of the educational and vocational training system.

It is clear, though, that paving the way for a smooth process of structural change in this way could not be enough with a view to cancelling the negative effects on the level of employment. In fact, while the direct effects of process innovations (both technical and organisational) are undoubtedly negative in the short run, the possibility that in the long run they might be totally offset by product innovation through the creation of new goods and new services is far from sure when the path of technical progress and of its diffusion speeds up. The fact that new goods and services may simply replace old ones rather than adding to them, plus the fact that they may themselves turn into process innovation by becoming intermediate factors of production, just cast more doubts about this optimistic long-run perspective.

It becomes therefore of utmost importance to consider whether the process of structural change can be managed, in the sense of being directed, or at least significantly influenced, by public policy towards satisfying the abovementioned conditions for full employment. In order to do this, it is necessary to have a clear view of what determines the driving forces

[9] This fundamental condition is, according to Pasinetti, the sum of two conditions: a capital accumulation condition (each sectoral new investment must be equal to the corresponding sectoral demand multiplied by the population growth rate) and a macroeconomic condition (total amount of demand equal to potential national income). If this condition is satisfied, full employment and full capacity utilisation will be achieved (Pasinetti, 1983, pp. 47-54).

at the root of its complex and cumulative process; in other words, it is necessary to look at the working of the "determinants of the determinants".

3. The "determinants of the determinants" of structural change

It has been noted that the explanation given by Pasinetti about the structural change is not a satisfactory one. "Although Pasinetti relates both factors [changes in coefficients of production and changes in the composition of consumers demand] with the learning principle, learning itself is essentially unexplained and therefore the question of what moves the driving forces of the economy remains unanswered" (Silva and Teixeira, 2008, p. 286).

Looking at "what moves the driving forces" of the process of structural change of an economic system allows us to single out some policy and institutional factors that are directly manageable in order to give this process a direction strategically advantageous towards full employment.

3.1. Income distribution

A first factor capable of "moving the driving forces" of structural change can be detected in the distribution of income. A demand increase for goods and services can derive from process innovation itself through the price and income effects of lower prices, and differs according to individual price and income elasticities. Being these elasticities different according to individual levels of income, income distribution comes to affect the aggregate increase in demand both for old and for new goods and services. This increase in demand works automatically in the direction of compensating the loss of jobs due to technical progress, and can be considered endogenous to it; but additional increase in aggregate demand can be obtained exogenously from direct policy action towards reducing both personal and functional inequality in the income distribution[10].

A wide range of actions of an institutional nature can be taken to this aim. Although someone thinks of excessive income inequality (whatever the quantitative definition of it) as a result of the efficient working of a competitive market economy, it is more correct to see it as a consequence of its bad functioning, failures, and distortions. The degree of monopoly, following Kalecky's approach, can be considered one of the most relevant institutional factors at the root of excessive income inequality. Therefore, measures taken in order to free the market from restrictions to competition and to reduce the degree of monopoly (together with the power of large multinational corporations) would help towards a more even income distribution and higher aggregate demand.

The abnormal expansion of the financial sector (a distinctive feature itself of structural change) and the absence of appropriate regulation are notoriously seen as driving forces of the excessive uneven income distribution[11]. Actions towards establishing an effective regulatory framework for financial markets, and consequently reducing their power and their size, besides being a step towards more macroeconomic stability, would also help to reduce excessive inequality in the income distribution.

A third major cause of growing income inequality is the progressive deterioration of industrial relations, brought about by unleashed deregulation of labour markets, and

[10] For a suggestion of the main policies to reduce inequality of income distribution, see Fadda (2016a).
[11] For a good treatment of this issue, see Tridico (2017).

falling bargaining power of workers' organisations. The persistent gap between, on the one hand, the rate of wage increase and, on the other, the rate of productivity increase (ILO, 2017) is the main mechanism through which this loss of power of labour *vis à vis* capital shows its effect. Ideology and strong pressure from large corporations together with unregulated movements of capital and labour in a globalised world converge towards growing concentration of income and wealth in a small portion of the population.

Beside acting on these factors in order to affect market income distribution, institutional restructuring of transfers (both in money and in kind) plus taxation should help to tackle excessive inequality in disposable income. In addition, of course, public expenditure remains the traditional tool to be used to achieve appropriate aggregate demand management.

All these kinds of measures should be organically planned if consumer demand has to be stimulated in order to provide new job opportunities for the workers initially displaced by technological and organisational process innovations, given the fact that "there is nothing in the structural evolution of technical coefficients on the one side and of per capita demand on the other, as such, that will ensure fulfilment of the macroeconomic condition [total expenditure must equal potential national income[12]], i.e. the maintenance of full employment. Therefore, if full employment is to be kept through time, it will have to be actively pursued as an explicit aim of economic policy" (Pasinetti, 1983, p. 90).

3.2. Composition of consumer demand

While the point developed above concerns the level of aggregate demand, of similar importance with regard to the shape of structural change is a second factor: the composition of consumption demand. The evolution of the patterns of consumption is relevant because the expansion in the production of new goods and services depends on it, and also because, given the different labour coefficients of different sectors, the capacity of creating new demand for labour is strictly linked with the evolution of the composition of final demand.

It is precisely on the composition of final demand that institutional factors play a major role. The "learning process" of consumers to which Pasinetti refers may develop in different ways since sticky habits, lacking or imperfect information, social pressure, emulation or consumerism, and other sources of motivation are able not only to delay or speed up, but also to direct the choices about new consumption made possible by the increase in income. In this field, cultural factors and all that mix of attitudes, tastes, and higher-level preferences that A. Sen labelled under the name of "capabilities" exert a strong effect.

In addition to these cultural factors, a decisive impact on the composition of final demand is given by the structure of public expenditure. The provision of public goods and public services, the public commitment for merit wants, the expenditure for the environment, and the improvement of the welfare state may give a crucial impulse on the volume, speed, and shape of the evolution of final demand. The capability of State institutions, and the visions and preferences of policy makers are determinant factors in this field.

A new element must nowadays be considered as capable of deeply affecting the evolution of consumer demand. It is the power gained by the producers as a consequence of the development of the so-called "fourth industrial revolution". One of the most relevant features of cyber-physic systems is the use of big data. In fact, an enormous mass of information about each individual personal profile is collected, without people being aware, simply through their daily access to various internet platforms. Through

[12] As described in footnote 9.

sophisticated software provided with gigantic treatment capacity, these data are elaborated in order to obtain strategic personalisation of the consumer-producer relationship. In this way, producers are able to modify the behaviour of consumers, who are led, without them realising it, to make specific consumption choices inspired by the producers themselves, whose decisions, in turn, are influenced by the treatment of the big data acquired from consumers[13]. If, on the one side, this eases the correspondence between producers' choices and consumers' choices, there is no guarantee that producers' choices are sufficient to create new jobs to the extent needed to compensate the jobs displaced by the growing flow of technological innovations. On the contrary, it is likely to happen that increased consumption of new goods and services actually contributes to further displacement of more jobs. For instance, it may happen that the increase in the use of new electronic entertainment actually displaces attendance to theatres or cinemas, that online shopping throws out of the market small shopkeepers and shop assistants, that online ticketing destroys jobs in travel agencies, that the use of innovative electronic domestic equipment promotes the self-production of home services, and so on, with a possible negative net effect on employment. Actually, some goods and some online services seem to stimulate the growth of a kind of "self-service society", where the production of many services is shifted from the "wage economy" to the "non-wage economy". Because of the complexity and the ambiguous trends of these dynamic forces, this is another area where institutional factors may play a strong role.

3.3. Speed and direction of technical progress

A third field where institutions and policy measures play a most relevant role in the process of the structural dynamics of the economy is given by the mix of determinants that affect both speed and direction of technical progress. This is not the place for a debate over the explanatory factors of technical progress; but, from an institutional point of view, attention must be drawn to the fact that innovation policy is the most important tool through which industrial policy can contribute to shaping the future sectoral composition of national production of a country. It is clear that the effects of structural change can be beneficial for a country conditionally on the general reduction of coefficients of production (including labour coefficients) being associated with appropriate expansion of sectors of high growth and employment potential. Countries with fast-growing sectors will reap the benefits of structural change, while countries with slow-growing (or declining) sectors will only suffer negative consequences in terms of economic growth and of employment. Therefore, governing and somehow directing the process of innovation towards appropriate sectors means to a large extent governing the process of structural change, and the balance between jobs destroyed and jobs created in a country.

Taking account of these interacting forces, two fields show the need for strong institutional engagement. The first is the redefinition of the role of the State. Theoretical analysis and empirical evidence show it is not true that withdrawing the State and giving way only to free play of market forces will benefit the economy of a country. Particularly in this area, a strong action of the State is required not only in terms of indirect incentives, but also in terms of direct investment in research and in innovation activity in public sectors in order not only to speed up the rate of technical progress, but also to channel it into

[13] Well before the full explosion of the "fourth Industrial revolution", all these kinds of problems had been clearly outlined by Harvey (2005).

directions that may support an appropriate evolution of the sectoral composition of the national product (Mazzucato, 2013).

The second field is the implementation of a strong industrial policy. Many ambiguities can hide behind this term. In opposition to the view that any industrial policy of the State would be not only useless but also harmful, because, by interfering with the free play of market forces, it would distort all processes of efficient allocation, is the view that the State should directly manage, sector by sector, through a sort of centralised planning, all production and investment decisions. None of these is correct. A correct interpretation of industrial policy should ascribe to the State the task of taking, within the frame of a strategic view of the evolution of the economic system, a set of coherent measures required for achieving better economic performance than the simple working of the free market would be able to achieve (Lall, 2006). It is not a question of replacing the State with market forces, but a question of tasking the State with supporting the process of structural change towards the achievement of long-term strategic goals. Public investment can be a very effective tool to this end: by providing public goods relevant for industrial development, supporting the short-term social costs of adjustment, and producing a positive impact on final demand and its composition.

Two strategic sectors in which technical progress must be encouraged and stimulated by public intervention are those of energy and environment. Both are sectors from which the divergence between public interest and particular private interests could distort the flow of research and development activities. Public policy is required for public interest to prevail and for the process of structural change to follow a path capable of ensuring sustainable growth and full employment.

Finally, it must be recalled that the speed of technical progress and of spread of innovations is positively correlated with the competitive structure of the market. All kinds of restrictions to competition tend to slow down the path of technical progress, although some degree of monopolistic protection seems to be acceptable in the early stage of the introduction of a new technology or of a new product, in order to attract resources and private investment in R&D. This latter possibility is, though, totally different from blocking the system with widespread areas of protection against market competition. This is clearly another area where policy for institutional change could help in governing the process of structural change of the economy.

3.4. Balance of trade and international specialisation

As mentioned above, in an open economy sectoral specialisation is related to its rate of growth and to its employment dynamics. In fact, the multiplier effects and the cumulative causation process of structural change have strong interactions with foreign trade. In the multi-sectoral model *à la* Pasinetti, a distinction has to be made, within the vector of final demand, between demand for domestic and demand for imported goods, and similarly a specification has to be made, in the matrix of technical coefficients, as to whether the inputs are domestically produced or imported from abroad. Again, we do not intend to go here into the details of the possible calculations[14], but rather we intend to look at the role

[14] Since the publication of the work by Miyazawa (1960), perhaps the most interesting and extensive considerations in this field are to be found in the in Rodrik's works. See, for all, Rodrik (2007). Of great interest is the study by Autor (2014), in which about one third of the loss of manufacturing employment in the USA is ascribed to imports from China.

that institutions can play in terms of freeing the economy from the risk of being trapped into some specific sectoral specialisation that is detrimental to its long-term growth. Leaving aside the explanations of the structure of international exchanges based on the comparative advantage principle, the factor endowment theory, or the Samuelson-Stolper theorem, attention must be drawn on the institutional factors that are more relevant in this field.

In general terms, if we adopt the notion of institutions as "patterns of behavior actually followed"[15] even by organisations and States, we find that the main institutional factor affecting the evolution of international exchanges is the model streaming from the neo-liberal ideology, according to which unregulated free trade is always good for all. This belief, together with the tremendous fall of physical and cost constraints to movements of goods at global scale and the neo-mercantilist "mania", may lead to reinforce any initial disequilibrium in the balance of trade of a country, stressing and accentuating a spiral of international specialisation even if it would be detrimental for growth and employment in that country. A second institutional factor of utmost importance in determining the structure of the international exchanges of countries is the overwhelming role played by multinational corporations. By "shopping around" among countries competing with each other to offer the best conditions (which often is tantamount to saying the worst social and labour standards) to attract foreign direct investment (FDI), they are able to decide where to place plants and services, and what sectors and stages of production locate in different countries. This affects deeply the structure of foreign exchanges of a country, as well as the structure of its productive system. The path and the content of technology transfer comes also to be influenced by FDI. Alongside this direct impact, the power of multinational corporations is able to exert an indirect impact through their deep influence on the content of international treaties and "free trade" agreements, such as the North American Free Trade Agreement (NAFTA), the Comprehensive Economic and Trade Agreement (CETA), the Transatlantic Trade and Investment Partnership (TTIP), and so on. We can add various operations such as mergers, acquisitions, downsizing, restructuring, relocations, and disinvestments that multinationals are usually free to accomplish in countries where they have located their plants, and we have a clear idea of how tight the relationship between the institutional set up and the structure of international economic relations of a country is. Therefore, acting on these institutional "determinants of the determinants" is a way of governing the evolution of the productive system of a country.

3. Possible role for national policy

At this point, a fundamental question comes to the fore: how can each single country act effectively on the mentioned institutional variables? In other words, how can it make the appropriate choices in terms of economic policy in order to govern and pilot the process of structural change of its own economy towards the objective of more growth and employment? Part of the answer lies in the capability of the public administration and in the willingness and ability of politicians and policy makers in general. This is a problem that it is not going to be dealt with in this note, while some hints are devoted

[15] The literature about the definition of "economic institutions" is very extensive. For the notion used in this paper, see Fadda (2012).

instead to the problem of the degree of freedom left to nation States, or, in other words, to the constraints that the global economy and the international institutions of governance of the world economy impose on single States. Surely, many national governments are not able to fully exploit in the right direction the degree of freedom that is left to them at the present (and this is already a problem), but the problem to focus here is the strength of these constraints and the search for possible ways to get over them.

In general terms, we can consider the constraints as coming from three sources: the lack of regulation of worldwide movements of capital and goods, the international institutions of economic governance, and the power of multinationals. These factors affect deeply the four "determinants of the determinants" of institutional change that have been mentioned in the above chapter, and reduce significantly the degree of freedom for national choices of economic policy.

The lack of regulations of international movements of goods and capital has come out of deliberate plans of national governments to abolish all kind of boundaries, restrictions, and regulations of the huge flows that the spread of technology of information processing, telecommunication networks, and sharp decline in transport costs have made possible. The volume of trans-border transactions (particularly financial transactions) has become exorbitant even in comparison with the volume of the public budgets of nation States, and at the same time information asymmetries (most interconnections and transactions may even remain unknown to regulators) and altered balances of power between global actors have made any possible regulatory activity by nation States extremely difficult and generally powerless. Particularly, the boosted financialisation in the world economy has severely curbed the possibility of effective national government action towards more equal income distribution and more nationally oriented industrial policy (Tridico, 2017).

The present structure of global economic governance is totally inadequate. International bodies, on the one hand, are pretty ineffective in regulating global markets and particularly financial markets; on the other hand, some of them are able to impose severe restrictions to national choices of economic policy, especially in those countries that mostly suffer from distortions of the process of structural change, and are more in need of financial help. Such bodies are mainly the World Bank (WB), the International Monetary Fund (IMF), and the European Commission. One could add that these institutions also suffer a certain lack of democratic legitimacy, both because they are unbalanced in their composition and in their decision-making process with respect to the economic and political weight of countries in the world scenario, and because they lack accountability (Fadda, 2014). Particularly, the economic governance of the European Union imposes on Member States such severe constraints (also of recessionary nature) that prevent the weaker Member States from planning adequate public investments and from adopting those welfare systems that would support the evolution of coefficients of production and coefficients of consumption according to that "macroeconomic condition" envisaged by Pasinetti in order to achieve growth with full employment.

The power of multinational corporations is such that not only are they able to influence the content of any regulatory activity and international agreement, but also the power itself allows them to directly interfere and prevail over what would be the best policy decisions in the national interest. They may also override nation States' sovereignty by penalising, in their decisions about investment allocation, those countries with stricter legislation on social welfare, on environment regulations, on tax regimes, on employment protection, and on labour standards. In addition, they may also compel nation States to soften their

legislation on such matters. Beside, through plant relocations and downsizing, they can directly affect the productive structure of one country, the spread of innovations, the level of unemployment, and the level of aggregate demand, while, by simply threatening such decisions, they can reduce the bargaining power of trade unions and disrupt solidarity among workers. All this behaviour is also likely to impact negatively on income distribution. So, the degree of freedom left to nation States for effectively acting to change the institutional frame that regulates all these variables is severely reduced (Hertz, 2001; Roach, 2007).

In order to remove the limits imposed by these three sources of constraints on the possibility of effectively governing the determinants of structural change of a country, it is necessary to take measures along three directions. The first one is the introduction of a proper degree of market regulation. The international flow of goods, and even more the financial flows, must be put under control. The idea of self-regulating efficient markets is just a myth, and there is enough empirical evidence about the disastrous consequences of leaving international markets, and particularly financial markets, unregulated. The second direction is the reform of the international bodies of global economic governance. Since in the global economy nation States have legitimacy but lack effective powers, and international bodies could have effective powers but lack democratic legitimacy, an efficient balanced combination should be found between regaining single States' sovereignty in some fields (such as economic policy and fundamental rights), and at the same time strengthening cooperation among them in a multipolar world through ensuring international bodies' democratic legitimacy and operative effectiveness. The third direction is the reduction of the power of multinational corporations. They must be put under and not above the law, and the law itself must not be shaped under their dictates or anyway under their pressure.

One could ask at this point how, in the present international "scenario", significant steps ahead can be made along these directions, but in order to avoid engaging in an endless chain of questions about what makes possible what (which would lead far away and beyond the nature of this paper), it is better to stop here. This issue is left as a subject for considerations of pretty political (and geo-political) nature. The belief remains that no deterministic mechanisms are responsible for the shape attained by structural change, but, rather, that institutions and political choices are the main contributing factors.

4. Concluding remarks

As a way of conclusion, we can sum up the main points touched in our line of reasoning. The aim of the paper was not to make quantitative descriptions or to work out a formal model to deal with the problem of structural change, but to draw attention to the institutional components of the process.

Structural change can be defined as the change in sectoral value-added shares of an economy over time. It is associated with economic growth via changes in the vector of final demand and in the matrix of technical coefficients of production. The question of whether it is growth that causes structural change or, the other way round, it is structural change that causes growth, cannot be answered in either way. It is better to view the integration of the two causality nexuses in a kind of cumulative causation process linked with a multi-sectoral multiplier mechanism. In this frame, the main driving forces can be identified, within the demand side, in the level and the distribution of income via the Engel's law,

in the autonomous evolution of consumer tastes, in the evolution of the demographic structure, and in the structure of import and exports; while, within the supply side, we found fundamentally the role of technical progress, and the shift of capital and labour between sectors of different productivity and different rates of profit.

The change in final demand and in technical coefficients of production creates disproportional growth and mismatches in the short run, while appropriate adjustments in the economic system could take place in the long run. The required adjustments could be calculated trough a multi-sectoral model *à la* Pasinetti, although it is not sure whether they could be fully achieved at all, and in any case not automatically: instability and mismatches could be permanent.

The negative effects of structural change on the level of employment could be offset by appropriate increase in demand for old goods and services and for new goods and services. Again, it would be possible to calculate the requirements of these increases in order to maintain full employment. If income and price elasticities and the aggregate demand management were not able to ensure the achievement of such increases, then complementary working time reduction would become necessary.

In order to govern the process of structural change towards the goal of offsetting the negative effects on the demand for labour and of achieving full employment, some action on the institutions that drive the "determinants of the determinants" are suggested. These actions may be grouped into four areas: the area of income distribution; the area of consumption patterns; the area of technical progress; and the area of foreign trade. However, in order to act positively and effectively on these areas, national governments must overcome some obstacles that derive from three sources: unregulated freedom of international movements of goods and capital; inadequacy of global economic governance; and excessive power of multinational corporations.

These are the origins of the main constraints that national governments suffer in their action to make appropriate choices for governing the process of structural change. Nevertheless, it must not be ignored that appropriate action to this end requires a strategic plan deeply founded on a systemic view of the economy, capable of capturing the interdependence and interaction of a multitude of variables and agents, and their evolutionary trend, as well as capable of involving the main actors of society in a sort of "network governance". A high degree of freedom of choice is therefore a necessary but not sufficient condition for good policy. Undoubtedly, some governments that are lacking this capacity would not be able to pursue such good policy even if totally free from constraints. On the other hand, governments provided with this capacity could be able to obtain satisfactory (although not optimal) results even under such constraints, which, in addition, could be made less stringent by appropriate action.

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