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There is now a large consensus about the role which has been played by innovation in the growth process occurred since the industrial revolution. However, innovation on its own could never have had an impact on growth if the goods services it produced had not been purchased by consumers and users or, in other words, if there had not been a demand for the new goods and services . The emergence of such a demand required (i) a disposable income with which consumers could purchase these goods and services, and (ii) a set of preferences which made these goods and services desirable.

In this paper we are going to explore the evolution of consumption in terms of a model in which economic development is mainly due to the differentiation of the economic system by the emergence of new sectors, called TEVECON(. Such a model is intended to analyze the economic development over the long run, for example over a period such as the one from industrial revolution to the present. Within such a model demand coevolves with innovation and with other aspects of the economic system. For instance, search activities increase with increasing demand but search activities themselves indirectly affect demand through their impact on product quality and on product differentiation. Furthermore, product quality, wages and education contribute to the co-evolutionary pattern that gave rise to the transition from the low quality (LQ) to the high quality (HQ) goods and services that we called elsewhere transition from necessities to imaginary worlds (TFSC, 2013). Our starting point is that the evolution of demand cannot be analyzed in isolation from that of the rest of the economic system. The evolution of the 'composition' of demand, or of the distribution of demand amongst the different types of goods and services that people purchase at different times,

becomes a relevant task for a theory of demand. Such a theory needs to be constructed in the context of the evolution of the whole economic system.

Observed economic development since the industrial revolution has been accompanied by a considerable differentiation of the economic system in the form of: (i) emergence of new industrial sectors based on new economic activities and on new types of goods and services; (ii) increasing quality and differentiation of the output of incumbent sectors. The observed economic development process occurred by three trajectories based on (i) growing productive efficiency, (ii) growing output variety, and (iii) growing product quality and differentiation. The combination of these three trajectories led to a growing output variety of the economic system and consequently to a growing variety of consumption possibilities.

Within this growing range of consumption possibilities different goods and services play different roles. Some goods can be considered necessities in a biological sense while others are manmade (artificial) types of consumption which in a past paper (Saviotti, Pyka, 2013) we called imaginary worlds. The term imaginary means that these new goods and services are not required for our biological survival but are an artificial construct of human societies. Following Witt (2001) we discuss the evolution of consumption as an evolution of needs and wants. In this sense necessities would be rooted in biological needs, even if the different ways in which these necessities can be satisfied cab partly due to wants generated by social interactions. On the other hand imaginary worlds can be either wants which do not correspond to any biological necessity and become socially induced wants or leisure activities.

This interpretation of the evolution of consumption bears some similarity to a hierarchical theory of consumption (Menger, 1950) according to which necessities would be lower goods and services and imaginary worlds would be higher goods and services. Such a categorization is incomplete since it neglects the internal quality and differentiation of the output of different sectors. Furthermore, in Keynes' (1928) terms the economic problem would correspond to the state of the economic system in which there is no longer a scarcity of necessities and in which people would be free to pursue higher activities. In this version of the paper we do not investigate leisure activities.

In this paper we interpret the changing composition of wants and of patterns of consumption in terms of the co-evolution of demand and innovation. The differentiation of the economic system is due to the combination of three trajectories, each one representing the long term trend towards the rise of efficiency, variety and quality (Saviotti, Pyka 2013). These trajectories are not independent. In particular, according to Pasinetti (1982, 1991) the saturation of

sectoral demand can lead to a potential imbalance between continuously increasing productive efficiency and saturating demand. Such imbalance, which could entail a serious bottleneck for economic development, could be overcome by the creation of new sectors based on new activities and outputs. In turn, the emergence of new sectors would raise the variety of the economic system. Thus, the saturation of demand could contribute to the differentiation of the economic system. It is then quite important to establish whether demand does indeed saturate. To test the existence of demand saturation we calculate Engel curves under a range of circumstances represented by different values of TEVECON parameters.

Complete demand saturation occurs when demand stops increasing and remains constant after a given level of income is attained. This is the type of saturation hypothesized by Pasinetti extrapolating the work of Engel (1857). We compare this situation with the cases of (i) non saturation, (ii) quasi saturation and (iii) oversaturation. (i) occurs when demand initially rises and then becomes constant as income rises, (ii) occurs when demand rises at diminishing rate without ever becoming constant as income rises, (iii) occurs when demand falls as income rises. Recent empirical work on Engel curves (Chai, Moneta, 2010,2011,2012) showed that complete demand saturation rarely occurs and that quasi saturation is a more frequent outcome, even if more complex Engel curves are observed in a number of cases.

Following our objective of exploring the co-evolution of demand and of other components of the economic system, we do not just try to calculate Engel curves but wish to explore the way they are affected by several non demand variables and parameters. We do not conceive saturation as an inherent property of demand at a sectoral level, but as a property which is itself determining and determined by other non-directly demand related economic phenomena.

In this paper we introduce the income distribution originating from the distribution of competencies within two social classes, called low (L) and high (H), differing for their levels of education and of human capital. The L and H classes can be compared to blue and white collar workers or to low and high skill workers respectively. As it will be seen, the relative income of the two classes is affected by the initial distribution of population between the two classes, by the relative allocation of educational resources, and by the relative quality of education.

Some preliminary results:

The Engel curves we calculate show the presence of complete demand saturation only in a limited number of cases. Quasi-saturation and oversaturation occur much more frequently.

The shape of the Engel curves is affected by technological opportunity, by inter sector delay, by investment in education etc

The shape of Engel curves differ considerably for the two social classes. For example, under a wide range of circumstances the Engel curves of the L class show oversaturation while those of the H class show quasi saturation. The shape of the aggregate Engel curves depends on the relative size of the two classes, and on their endowment and quality of education.

Demand saturation does not always occur. In fact complete saturation is rare. Furthermore, whatever the type of saturation occurring, saturation is not an intrinsic property of sectoral demand but is affected by a large number of variables which are not directly related to demand.

Complete demand saturation is not necessary to induce the emergence of new sectors. Quasi saturation, involving a declining rate of growth of demand with income suffices for that.

The dynamics of demand, including its possible saturation, cannot be separated from the dynamics of the whole economic system. In the co-evolution of innovation and demand, saturation can be both a cause and an effect of the emergence of new sectors, contributing to their emergence but being affected by their presence and dynamics later on.

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