



The complex interactions between economic growth and market concentration in a model of structural change[☆]



Tommaso Ciarli^{a,*}, Marco Valente^b

^a SPRU, University of Sussex, United Kingdom

^b University of L'Aquila & LEM, Scuola Superiore S'Anna, Italy

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ABSTRACT

We study the relation between variety, market concentration, and economic growth, along different phases of economic development which entail a number of changes to the structure of production and consumption in the economy. We focus on three aspects of structural change, which are connected and are correlated to variety, market concentration, and economic growth: (i) product quality; (ii) firms' mark-ups; and (iii) imitation of consumer preferences for price and quality. We model the interactions among several aspects of structural change such as firm size and hierarchical structure, innovation in capital vintages, the emergence of social classes, income distribution, and consumer preferences across and within classes. We find that market concentration has a significant and positive impact on economic growth only in the presence of sufficiently large demand. The strongest effects emerge in the presence of a more skewed firm size distribution and firms producing higher priced and higher quality goods. We find also that this effect is influenced strongly by different aspects of structural change. Changes in the behaviour (or income) of the less wealthy income classes is crucial as is investment in new capital vintages, and the emergence of diverse income classes with heterogeneous consumption preferences. In contrast, we find that supply side product variety, *ceteris paribus*, has no significant effect on growth.

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1. Introduction

The main aim of this paper is to study the relation between variety, market concentration, and economic growth, along different phases of economic development involving changes to the structure of production and consumption in the economy. We focus on three aspects of structural change which are linked and are related to variety, market concentration, and economic growth: (i) product variety, measured as disparities among the quality of final goods; (ii) firm differentiation based on mark-ups related to the quality of goods, which segments the access to high quality goods; and (iii) consumer preferences related to price and quality based on a process of imitation by less wealthy income classes of the preferences

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* Corresponding author. Tel.: +44 1273877973.

E-mail addresses: t.ciarli@sussex.ac.uk (T. Ciarli), marco.valente@univaq.it (M. Valente).

of wealthier income classes. All three aspects influence the selection of firms and, therefore, market concentration, in ways that differ in the different phases of economic development, and which, we argue, generate different patterns of demand. Differences in the timing of concentration and whether it is induced by dispersion on the demand or supply side, might affect economic growth differently. We discuss these differences in the next section.

To investigate the relation between variety, market concentration, and economic growth we use a model of the interactions among several aspects of structural change such as firms' size and hierarchical structure, innovation in capital vintages, the emergence of social classes, income distribution, and consumption preferences across and within classes. In our model, the economic structure goes through different phases, ranging from Malthusian stagnation to sustained exponential growth. Also, in our model, growth is the result of a Kaldor–Young dynamics: an outcome of cumulative causation generated by productivity growth and domestic demand growth and change.

Our paper contributes to several theoretical literatures and, especially, work on structural change (Cimoli, 1988; Verspagen, 1993; Cimoli and Porcile, 2009; Saviotti and Pyka, 2008), unbalanced growth (Murphy et al., 1989a,b), and the relation between

innovation, income distributions and growth (Zweimüller, 2000; Föllmi and Zweimüller, 2006). Our model differs from these models in several respects, and our work contributes in three main ways.

First, we go beyond purchasing power and saving propensity (level of demand); instead, we study the role of the distribution on consumption preferences (distribution of demand). We focus on the effect of consumer selection on market concentration and study three different channels through which consumer selection determines market concentration: heterogeneity of the quality of goods across firms; heterogeneity of prices across firms; and consumer demand elasticity with respect to the price and quality of goods.

Second, we consider the interaction between the concentration of demand and the concentration of supply, which, in our model, are endogenously related. The organisation of production into different layers of managers and workers, generates classes with different income and consumption preferences. Therefore, changes to the organisation determine the distribution of income and of consumption preferences. The firm's organisation and capital vintages generate cost heterogeneity. In addition, firms produce goods of different quality. Heterogeneous consumers choose goods from these firms. Depending on their elasticity with respect to price and quality, each class of consumers selects a subset of firms, which determines market concentration. The skewness of the distribution of market shares, in turn, conditions the firm's organisation (e.g., some firms remain small, with a few layers of management, others grow large and have multiple management levels).

Third, we investigate this interaction in a model in which the structure of the economy changes endogenously along different phases of economic development (see Section 2.2).

We find that market concentration has a significant and positive impact on economic growth only in the presence of sufficiently large demand – in a Schumpeter Mark II pattern (Malerba and Orsenigo, 1995). Otherwise, concentration has no significant effect. For demand to play such a catalytic role, if firms are highly differentiated in terms of product quality, less affluent consumers must converge towards the consumption of the more affluent classes. We find the strongest effect on the model when the distribution of firm size becomes more skewed and is concentrated on firms producing higher priced goods. We find also that this effect is strongly influenced by different aspects of structural change. As already noted, changes in the behaviour (or income) of the less wealthy classes is crucial; also important is investment in new capital vintages and the emergence of diverse income classes with heterogeneous consumption preferences. In contrast, we find that supply side product variety, *ceteris paribus*, has no significant effect on growth.

In Section 2, we discuss the theory underlying the model's growth process and the relation between market concentration and economic growth. We refer to the relevant literature and argue for the need for a complexity approach to the study of structural change. In Section 3 we describe the model, focusing on the main aspects of interest in the context of this paper and on the modifications with respect to Ciarli et al. (2010, 2012). In Section 4 we present and discuss the results. Section 5 offers some conclusions.

2. Motivations and related literature

2.1. Concentration, structural changes, and economic growth

To the best of our knowledge, the literature contains no systematic investigations of the relation between market concentration and economic growth and little is known about how this relation is affected by the timing of market concentration – in different phases of economic development – and by the different mechanisms inducing demand and supply side concentration. There are some studies that examine the relation between sectoral concentration

and economic development and propose that economies first diversify and then specialise again (Imbs and Wacziarg, 2003).¹

Most industry models argue that market growth induces entry and, therefore, deconcentration even if the incumbents increase their output (Spence, 1981). However, Hall (1984) shows that when growth can be anticipated and in the presence of learning (or, as in our model, increased productivity and output) growth leads to higher concentration.

The large literature on sectoral systems of innovation (Malerba and Orsenigo, 1995; Dosi and Nelson, 2010) shows that, in some industries, innovation is driven by large incumbent firms Schumpeter (1942), while in others it is driven by the entry of new small firms (Schumpeter, 1934). Arrow (1962) argued for an intermediate position: some competition is necessary to incentivise investment, but too much competition does not allow the accumulation of sufficient profit to fund innovation. More recently, Malerba et al. (2007) shows that market structure is related to demand dynamics and the formation of niches.

Growth model are silent about how market concentration influences growth. In the Unified Growth Theory (UGT) model proposed by Desmet and Parente (2012), productivity growth is related to increased firm size; small artisan firms are replaced by large capitalist firms. Market concentration increases investment and economies of scale, which has a positive effect on economic growth. The Schumpeterian model proposed by Possas et al. (2001) shows an inverse causal structure: growth in latent productivity (the technological frontier) increases concentration. However, the relation suggested is similar: market concentration is positively related to economic growth. Peretto (1999) models a two sector economy in which an intermediate sector that invests in Research and Development (R&D) and shows increased productivity is at the heart of an endogenous growth process. In the presence of more concentration in the intermediate sector and increasing firm size, investment in R&D also increases, with a positive effect on economic growth.

In line with the structuralist tradition, in our model, economic growth is the result of positive feedbacks between demand (level and composition) and productivity dynamics. Increased demand can be the result of a reduction in price – following increased productivity – or an increase in the number of workers. Population growth is a result of firm growth due to increased output or to consumer selection and market concentration. When a firm grows, the number of workers increases more than proportionately, due to the need to hire executives to manage the lower tier workers. That is, for given level of output, in our model, an economy with many small firms hires fewer workers than an economy with a few large firms.

Productivity increases when consumer goods firms replace old capital vintages with new, more productive, capital vintages. For this to happen, the following conditions must hold. First, demand must outstrip the firms' productive capacity either because of an increase in final demand or, for a given level of demand and capital depreciation, the firm's market shares have increased due to consumer selection. Second, the demand for new capital must be sufficient to allow capital goods firms to make a profit and allow investment in hiring R&D workers. Third, the investment in R&D must be successful. Given that R&D investment, by nature, is uncertain, the higher the investment, the higher the probability of increased productivity.

In other words, demand trickles down from final consumer to capital good supplier. This trickle down process varies with the condition of the economy and various parameters, which we study in this paper. Productivity trickles up from capital producers to final

¹ Recent studies show that high-income economies are more diversified than low and middle income economies (Hidalgo et al., 2007); however, we do not investigate this aspect in the present paper.

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